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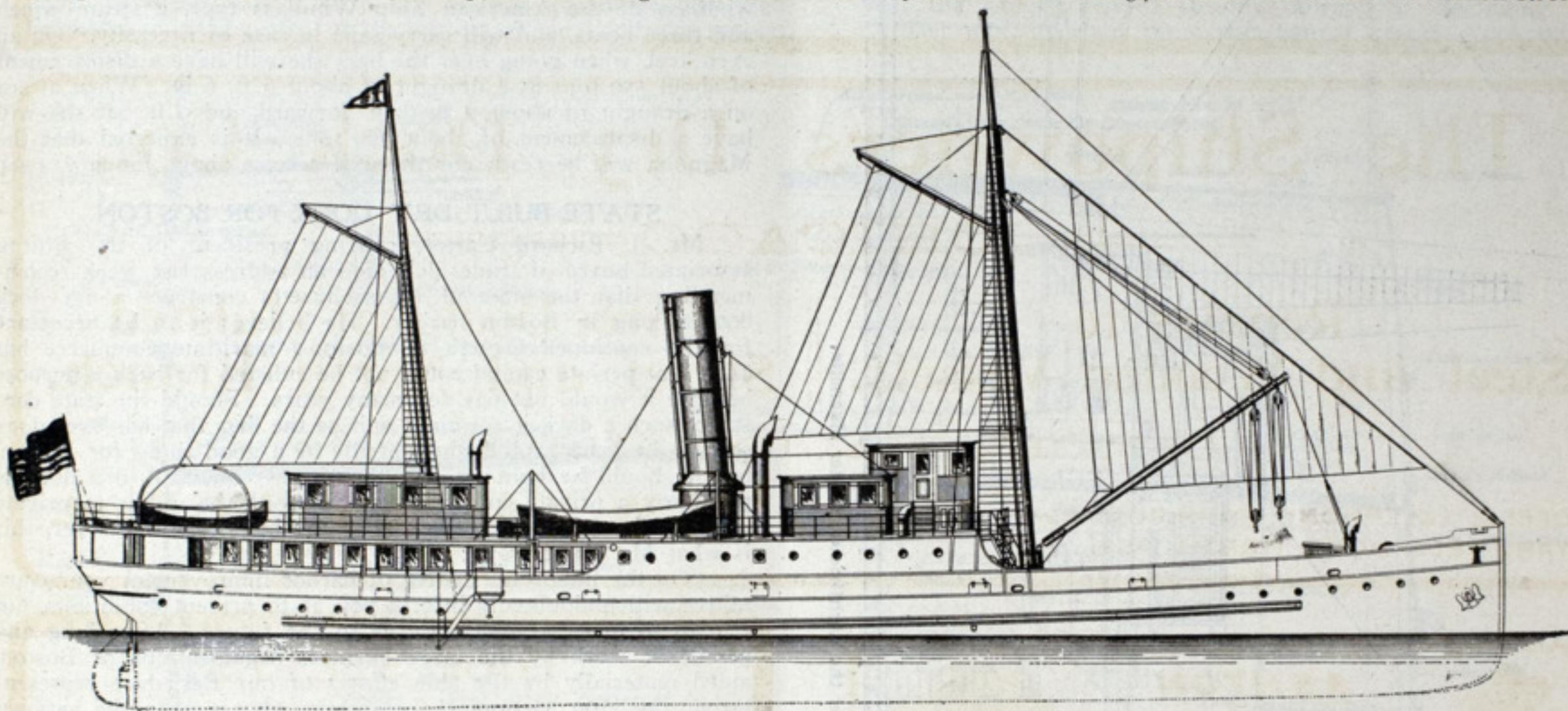
No. 17

UNITED STATES LIGHTHOUSE TENDER MAGNOLIA.

In the course of a few days bids will be opened for a new tender for the inspector of the eighth lighthouse district. This district extends from Mobile, Ala., to the Rio Grande river and up the Mississippi river 400 or 500 miles. Besides covering all the navigation along the coast between the points mentioned, this district embraces all the inland sounds, inlets and the rivers emptying into them. To enable the inspector to perform all the duties which this territory covers a departure has been made in the design for the tender for this district. The tender, the name of which will be Magnolia, will be 173 ft. 2 in. over all; length between perpendiculars, 165 ft.; beam molded, 30 ft. 3 in.; depth of hold, 13 ft. 1 in. The departure in design will be

Owing to the necessity of operating at sea and in the shallow bays and rivers which abound in this district, a large ballast tank is provided abaft of the cargo space and just forward of the boiler room. The capacity of this tank is about 90 tons and pumps and equipment will be fitted for emptying the same in about one and one-half hours. The tank will be filled from the sea and also by the pumps. The capacity of the forward trimming tank is about 7 tons. A large trimming tank will be built in the stern of about 31 tons capacity to trim the vessel by the stern when at sea.

The two engines will be of the vertical, inverted, direct-acting, open-front, surface-condensing, fore-and-aft compound type with cylinders 18 in. and 34 in. in diameter and a common stroke



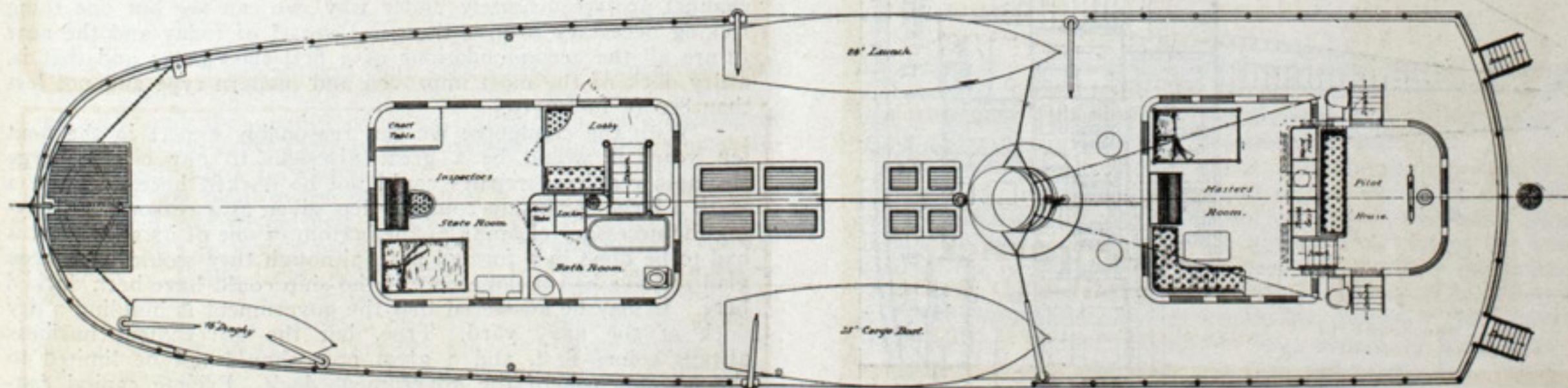
Outboard View of the Lighthouse Tender Magnolia

in the type of boat. She will be of the bridge-deck type, minus the fore-castle and poop decks, but the bridge deck will extend to the stern over a deckhouse on the main deck. By carrying up the sides amidship very cool and commodious quarters are provided, whereas in the open-deckhouse type, the quarters in this locality have to be located over the boilers. The latter would never do for a tender working in this district where the temperature is nearly always above summer heat.

The tender will be schooner rigged. The foremast will be of sufficient size to carry a very large cargo boom. The bulwarks will fair into the superstructure sides and extend to the stem and to the stern. A passageway is provided all around the after deckhouse on the main deck. The crew are quartered forward,

of 26 in. Solid cast iron propellers about 7 ft. in diameter will be fitted. Steam will be furnished by two boilers of the Scotch type, designed for a working pressure of 120 lbs. per square inch. The boilers will have a mean diameter of 12 ft. 6 in. and a length of 12 ft.

The inspector's quarters will be principally located in the main deckhouse with a suite of private quarters in the after deckhouse on the spar deck. The latter will consist of a chart room and state room combined, a bath room, with large linen closet and a lobby or smoking room at the head of the stairway leading to his quarters on the main deck. The main-deck quarters will contain two large state rooms in the after end; a pantry on the port side forward with a bath room in the same position on the



Deck Plan of the Lighthouse Tender Magnolia.

below the main deck, and separate compartments are provided for the crew proper and the machinists and oilers. Considerable attention has been given to the comfortable quartering of these men and they are well provided for. The usual trimming tank in the peak and the chain lockers just abaft it are provided. Abaft the crew space is located the main cargo hold, extending the full width and depth of the vessel. The capacity of this space is about 7,500 cu. ft.

starboard side; and the remaining space given over to the saloon, which is a comfortable, well-furnished and neatly finished room.

The officers are provided with a mess room below on the after lower deck; two state-rooms, a pantry and a bread room complete these quarters. A trunk stairway leads to the main deck through the upper engine room, and gangway is also provided by a booby hatch located just abaft the after deckhouse. The ladder of this hatch leads to the after store room,

TO IMPROVE BATH WORKS.

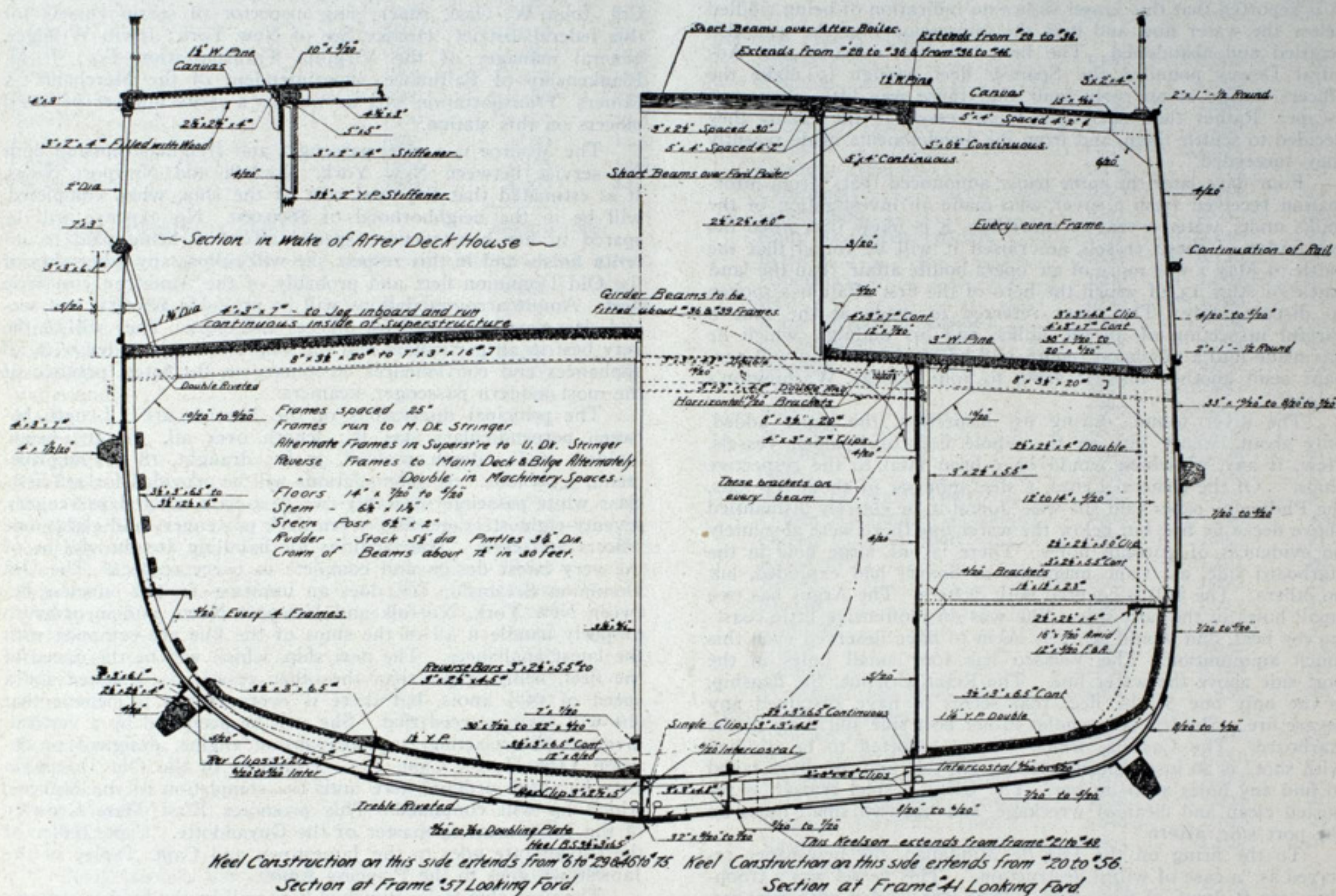
Henry T. Scott of San Francisco, chairman of the executive board of the United States Ship Building Co., who has been in Bath during the past week inspecting the works at that point absorbed by the combination, gave the people of Bath assurance that the plants of both the Bath Iron Works and the Hyde Windlass Co. would be enlarged. The capacity of the windlass works will be increased to meet a growing demand for the product while at the iron works a large pier will be built for docking and repairing purposes, and the yards and shops rearranged to accommodate new machinery and an increased force. Mr. Scott predicts that within a short time the Bath Iron Works will give employment to 3,000 men. He said:

"The fear expressed by some that the absorption of the Bath Iron Works by the United States Ship Building Co. would mean the closing of the works is absurd. A ship yard is unlike an ordinary manufacturing plant, depending more than any other for its success upon a good location. Bath has a waterfront and ship building facilities such as are hard to find anywhere. The plant at Bath and the Union Iron Works at San Francisco are the only two in the combination that have a suitable location for the construction of the heaviest tonnage, and the heaviest vessels which the company contracts to build must be constructed at either of these places. Bath has a great advantage over San Francisco in being so near to the sources of metal and coal supply,

Ship Building Co. will enable it to get some foreign contracts. At any rate, the American merchant marine is bound to grow, especially on the Pacific, and there will be busy times in Bath."

EXPORTS DURING SEPTEMBER.

The export figures for September are extremely encouraging. They are the largest ever shown for September, with the single exception of that month in the year 1900, and fall less than \$500,000 below the high water mark made in that year. The figures, as just presented by the treasury bureau of statistics, show the total exports in September, 1902, to be \$115,521,984, against \$106,989,926 in September, 1901, and \$115,901,722 in September, 1900, the highest figure ever shown by September exportations. Comparing present conditions with those of earlier years, the figures for September, 1902, are 25 per cent. in excess of those of September, 1898, 50 per cent. greater than those of September, 1890, more than double those of September, 1888, and nearly three times as great as those of September, 1885. This seems to indicate that the downward tendency in the export trade caused by the corn crop failure of last year has reached its lowest point and that the reverse movement toward normal conditions has begun. Following the failure of the corn crop last year the exports tended steadily downward. Beginning with October 1901, in which the export figures were \$145,000,000, the



and whatever disadvantages Bath may suffer in comparison with other Atlantic coast yards are more than offset by climatic advantages and the quality of labor. Here you have intelligent men, while the yards close to the coal and iron regions must depend largely upon foreigners.

"The best plant in the combination is that of the Union Iron Works, and the second best is that at Bath. If the United States company gets a contract for a large vessel for the Atlantic she will be built at Bath; if for the Pacific, it will become a question whether such a vessel can be built at the Bath Iron Works and taken around to the Pacific at less cost than she can be constructed at San Francisco. I consider the Bath Iron Works worth the expenditure of a large sum for improvements. The economies of the United States Ship Building Co. are to be effected by the assignment of special classes of work to the different yards, and not by the centralization of work in any one or two places. The outlook for the combination is very bright. A large amount of tonnage is to be built in this country in the immediate future, and, although the passage of the subsidy bill would be a great help to the ship builders, the construction of a great many ships for the American merchant marine does not depend upon the passage of the bill. One company on the Pacific coast is planning to build more vessels than all the Pacific yards can handle. I expect that the economies to be practised by the United States

movement was steadily downward until they reached \$88,000,000 in July of the present year. In August the upward movement began, reaching \$94,000,000, and September \$115,000,000, which is about \$9,000,000 in excess of September of last year.

This decrease in exports, as is well known, was due to the corn crop failure of last year and to the low price of cotton; and while the new corn crop has not yet begun to make its appearance in the export figures of the bureau of statistics, the movement of the new cotton year has been active and is the principal cause of the upward trend in the export figures. The cotton exports for September were 347,000,000 lbs., valued at \$30,000,000 in round terms, against 200,000,000 lbs., valued at \$16,000,000 in September of last year, and less than 200,000,000 lbs., valued at \$20,000,000 in September of the preceding year, 1900. Even breadstuffs show a decidedly upward tendency in the export movement during September, the total value of breadstuffs exported in September, 1902, being \$22,000,000, against \$12,000,000 in June, and \$21,000,000 in September of last year.

The above figures relating to cotton and breadstuffs, it should be understood, are those of the preliminary statement of the bureau of statistics, but include 98 per cent. of the entire export of the articles named, while the figures of the total exports of the month, although practically complete, are the preliminary figures and subject to the usual revision.

MINIMIZING DEWEY'S VICTORY.

Some time ago an engineering company undertook to raise the sunken Spanish fleet in Manila harbor, and according to the Manila American, some revelations are being made which tend to minimize Dewey's victory. The raising of the vessels has, the paper says, made it clear that few of them were struck below the waterline, and that they seem to have been scuttled by the Spaniards and not sent to the bottom by the admiral's guns. In connection with the raising of the gunboat *Marquez del Duero*, near Cavite, the Manila American says:

"When the gunboat was examined it was found that but one shot took effect on that vessel. It pierced the bow above the water line and the shell exploded in the vessel. This goes to prove that the guns of the fleet never put this little gunboat in the bottom of the bay, and the only conclusion as to its destruction is that the Spaniards scuttled her rather than have her fall into Admiral Dewey's hands. This version of the battle gained some circulation at one time, but was denied. Now that the seventeen vessels which lie in the bottom of the bay are to be raised, all doubts as to the manner in which the fleet was sent to the bottom will be settled. While this is true of the gunboat referred to, there is every reason to believe that few, if any, of the vessels were sunk by the fire from the American fleet. The engineers are now busy raising the steel cruiser *Ulloa*, one of the largest vessels in the fleet, now on the bottom of the bay. It is reported that this vessel shows no indication of being riddled below the water line, and it is the impression that she was also scuttled and abandoned. The fact, however, remains that Admiral Dewey pounded the Spanish fleet enough to make the officers decide at an early hour that there was little chance of escape. Rather than surrender their vessels to the enemy they decided to scuttle them, and from the developments made recently they succeeded."

Four days later the same paper announced that, "from information received from a diver who made an investigation of the hulks under water a year or more ago, it is likely that when the remainder of these vessels are raised it will be found that the battle of May 1 was more of an 'opera bouffe affair' than the land battle of Aug. 13, of which the hero of the first affair has spoken so disparagingly. The diver referred to made at the time a careful inspection of all the hulks, and his findings, which he has made into a tabulated report, will be of interest and will perhaps send another historic fable to join George Washington's hatchet."

The diver found, during his inspection, the paper added, only about twenty hits on the whole fleet of Spanish vessels, "few, if any, of which would have been fatal to the respective ships." Of the General *Leuza*, a steel gunboat of about 600 tons, the Philippine paper said she was "found to be entirely dismantled above decks by fire, but below the water line there were absolutely no evidences of gunshot holes. There is one large hole in the starboard side, as if the magazine or boilers had exploded, but no others. The hull is covered with oysters. The *Argos* has two small holes in the port side. She was an inoffensive little coast-survey boat, and would scarcely seem to have deserved even this much ammunition. The *Velasco* has four small holes in the port side above the water line. The *Reina Cristina*, the flagship, is the only one of the fleet that seems to have sustained any severe fire. She has seven holes in her port side and three in the starboard. The *Castilla*, which Dewey reported to be 'riddled with shot,' is an insignificant old wooden tub, and the diver failed to find any holes at all in her. The *Ulloa*, a steel cruiser, is reported clean and clear of wreckage, and has two small holes on the port side, astern."

To the firing on the *Isla de Mindanao*, the newspaper referred as "a case of wilful destruction." This vessel was a troopship, 400 ft. long, of 6,000 tons. "She was loaded with supplies, and was found by the diver to be still full of bales and cases below decks. When the American fleet appeared in the harbor she started to run for Bacoor, and the admiral sent a gunboat after her. She received one shot in the stern, near the stern-post, and one small one in the starboard side. The hole in the stern was made by an explosive shell, and is very large. It is said by some that the reason the *Mindanao* was beached at Bacoor is that she was loaded with the officers of the Spanish fleet, who deserted their ships, already scuttled, according to this version. All of her upper works were burned away. Of course an examination made under water is cursory and not conclusive, but in view of the question that has been raised, the raising of the ships will be watched with interest by naval people and the general public."

Ever since the navy department of the United States was established the naval officers have labored under the impression that the name of the French port Marseilles was spelled just as it has now been spelled. However, last week when the department got a telegram that the *Nashville* had arrived at Marseilles and the name was spelled thus on the bulletin printed for daily reference word came from the department printing office that the board on geographic names had decreed that the spelling was *Marseille*. As this board is the final authority on spelling *Marseille* it is.

SHIP BUILDING AT NEWPORT NEWS.

Newport News, Va., Oct. 22.—The large and palatial passenger and freight steamship *Monroe*, built by the Newport News Ship Building & Dry Dock Co. for the Old Dominion Steamship Co., was launched here Saturday morning. Mrs. Andrew Jackson Montague, wife of Governor Montague of Virginia, christened the new vessel as she started down the ways in the presence of about 8,000 people, many of whom came from distant cities. Excursions were run from all near-by points and several large parties came down from New York as guests of the Old Dominion company. Following the launching an elaborate breakfast was served at Hotel Warwick in honor of the fair god-mother of the *Monroe*, covers being laid for about 200. Several toasts were responded to by the more prominent guests. Among the well known shipping, ship building and railway men present at the ceremonies of the day were President W. L. Guilleadeu, General Traffic Manager H. B. Walker, Superintending Engineer H. C. Higgins, Asst. Engineer R. S. Haight, General Freight Manager F. N. Rouse, Emigrant Agent Peter McDonald, M. B. Crowell, agent at Newport News and Norfolk, all of the Old Dominion Steamship Co.; President Calvin B. Orcutt and Gen. Supt. W. A. Post, of the Newport News Ship Building & Dry Dock Co.; President George W. Stevens and General Manager C. E. Doyle, of the Chesapeake & Ohio railroad; General James A. Dumont, of Washington, supervising inspector-general of steam vessels; Col. John W. Oast, supervising inspector of steam vessels for this federal district; Horace See of New York; Irwin Weisiger, general manager of the Virginia Transportation Co.; J. M. Blankenship of Baltimore, superintendent of the Merchants' & Miners' Transportation Co., as well as a large number of naval officers on this station.

The *Monroe* is a steel passenger and freight steamship built for service between New York, Norfolk and Newport News. It is estimated that the total cost of the ship, when completed, will be in the neighborhood of \$800,000. No expense will be spared in her construction, special attention being paid to interior finish, and in this respect she will eclipse any other ship of the Old Dominion fleet and probably of the American coastwise fleet. Ample accommodations will be provided for first and second-class passengers and for officers and crew. They will be the very best in all particulars and the ship will be provided with all appliances and conveniences customary in the latest practice of the most modern passenger steamers.

The principal dimensions of the *Monroe* are: Length between perpendiculars, 344 ft.; length over all, 366 ft.; beam, molded, 46 ft.; depth, molded, 37 ft.; draught, 18 ft.; displacement, 5,375 tons. Accommodations will be provided for 122 first-class white passengers, twenty-two first-class colored passengers, seventy-eight steerage, fifty-seven deck passengers and eighty-one officers and crew. The facilities for handling freight will be of the very latest design and complete in every respect. The Old Dominion Steamship Co. does an immense freight business between New York, Norfolk and Newport News, and in order to properly handle it all of the ships of the line are equipped with the latest appliances. The new ship, which will be the queen of the fleet, being larger than the other vessels, is designed for a speed of 15½ knots, but there is every reason to believe that she will easily exceed that. She will be propelled by a vertical, inverted, direct-acting, triple-expansion engine, designed to develop 4,500 H. P. Capt. J. G. Hulphers of the Old Dominion Line has been ordered here until the completion of the *Monroe*, which he will command. This promotes First Mate Crowley of the *Jamestown* to master of the *Guyandotte*. Capt. Hiller of the *Guyandotte* goes to the *Jamestown* and Capt. Tapley of the *Jamestown* goes to the *Princess Anne*.

The next ship to be launched here will be the lumber steamer *Francis H. Leggett*, building for the Hammond Lumber Co. of San Francisco, which will go on the redwood trade on the California coast.

On the ways vacated by the *Monroe* Saturday, the keel will soon go down for the monster oil steamer which will be built for the Saginaw Steel Steamship Co.

Unless some new merchant work is secured in the meantime, the next keel to go down will probably be that of the 16,000-ton battleship *Louisiana*, which the ship yard will build in competition with the government force at the Brooklyn navy yard, where the sister ship, *Connecticut*, is building.

The battleship *Texas* will go in commission at the navy yard Nov. 3. Capt. W. T. Swinburne has been detached from the naval war college and ordered to command the *Texas* when placed in commission.

The entire North Atlantic squadron is expected in Hampton Roads about Nov. 10, to prepare for the winter maneuvers in southern waters. The torpedo flotilla at the navy yard has been ordered in commission at once.

The old training ship *Hartford* has sailed on her winter cruise. The *Essex*, *Lancaster* and *Monongahela* are in Hampton Roads.

The torpedo boat destroyer *Worden*, built by the Maryland Steel Co. at Sparrow's point, Md., has arrived at the navy yard, joining the *Whipple* and *Truxton*, which were already there. She is a sister of the *Whipple* and *Truxton*.

INTERNATIONAL MERCANTILE MARINE FLEET.

As a matter of current interest following are the vessels included in the Morgan shipping combination, now officially known as the International Mercantile Marine Co.:

| WHITE STAR LINE. | | | |
|-------------------------------|-------|---------------|---------------|
| Vessel. | Year. | Tons, gross. | Speed, knots. |
| Cedric..... | 1902 | 20,970 | 17 |
| Celtic..... | 1901 | 20,880 | 17 |
| Oceanic..... | 1899 | 17,274 | 21 |
| Majestic..... | 1890 | 9,965 | 20 |
| Teutonic..... | 1889 | 9,984 | 20 |
| Germanic..... | 1874 | 5,066 | 17.5 |
| Britannic..... | 1875 | 5,004 | 16 |
| Cymric..... | 1898 | 12,646 | 15 |
| Georgic..... | 1895 | 10,077 | 13 |
| Ceric..... | 1893 | 8,301 | 13 |
| Bovic..... | 1892 | 6,583 | 13 |
| Tauric..... | 1891 | 5,728 | 13 |
| Nomadic..... | 1891 | 5,748 | 13 |
| Gothic..... | 1893 | 7,755 | 15 |
| Delphic..... | 1897 | 8,273 | 11.5 |
| Athenic..... | 1902 | 12,234 | 12.5 |
| Corinthic..... | 1902 | 12,234 | 12.5 |
| Ionic..... | 1902 | 12,234 | 12.5 |
| Afric..... | 1899 | 11,948 | 13 |
| Medic..... | 1889 | 11,984 | 13.5 |
| Persic..... | 1899 | 11,973 | 13.5 |
| Runic..... | 1900 | 12,482 | 13.5 |
| Suevic..... | 1900 | 12,499 | 13.5 |
| Doric..... | 1883 | 4,676 | 14.5 |
| Coptic..... | 1881 | 4,355 | 14.5 |
| Gaelic..... | 1885 | 4,206 | 14 |
| Total (twenty-six ships)..... | | 265,079 tons. | |

INTERNATIONAL NAVIGATION CO., AMERICAN AND RED STAR LINES.

| Vessel. | Year. | Tons, gross. | Speed, knots. |
|--------------------------------|-------|---------------|---------------|
| Finland..... | 1902 | 12,760 | — |
| Kroonland..... | 1902 | 12,760 | — |
| Zeeland..... | 1901 | 11,905 | 16 |
| Vaderland..... | 1900 | 11,899 | 16 |
| Merion..... | 1902 | 11,635 | 14 |
| Haverford..... | 1901 | 11,635 | 14 |
| St. Louis..... | 1895 | 11,629 | 21 |
| St. Paul..... | 1895 | 11,629 | 21 |
| New York..... | 1888 | 10,674 | 20 |
| Philadelphia..... | 1889 | 10,433 | 20 |
| Kensington..... | 1894 | 8,669 | 14.5 |
| Southwark..... | 1893 | 8,607 | 14.5 |
| Friesland..... | 1889 | 6,409 | — |
| Westernland..... | — | 5,708 | — |
| Noordland..... | — | 5,150 | — |
| Rhynland..... | — | 3,868 | — |
| Belgenland..... | — | 3,873 | — |
| Pennland..... | 1870 | 3,867 | — |
| Ohio..... | 1873 | 3,392 | 13.5 |
| Pennsylvania..... | — | 3,166 | — |
| Indiana..... | — | 3,158 | — |
| Nederland..... | 1873 | 2,610 | — |
| Switzerland..... | 1874 | 2,602 | — |
| Conemaugh..... | — | 2,328 | — |
| Total (twenty-four ships)..... | | 180,366 tons. | |

LEYLAND LINE.

| Vessel. | Year. | Tons, gross. | Speed, knots. |
|---------------------------|-------|--------------|---------------|
| Devonian..... | 1900 | 10,405 | 14 |
| Winifredian..... | 1900 | 10,405 | 14 |
| Canadian..... | 1900 | 11,000 | 13 |
| Armenian..... | 1895 | 8,825 | 14 |
| Victorian..... | 1895 | 8,825 | 14 |
| Cestrian..... | 1895 | 8,823 | 14 |
| Iberian..... | 1900 | 5,300 | 12 |
| Caledonian..... | 1900 | 4,990 | 13 |
| Philadelphian..... | 1891 | 5,120 | 14 |
| Lancastrian..... | 1891 | 5,120 | 13.5 |
| Georgian..... | 1890 | 5,088 | — |
| Total (eleven ships)..... | | 83,901 tons. | |

DOMINION LINE.

| Vessel. | Year. | Tons, gross. | Speed, knots. |
|------------------------|-------|--------------|---------------|
| Dominion..... | 1894 | 6,618 | — |
| Vancouver..... | 1884 | 5,231 | 13.5 |
| New England..... | 1898 | 11,394 | — |
| Canada..... | 1896 | 8,806 | 16 |
| Commonwealth..... | 1901 | 13,000 | 16.5 |
| Cambroman..... | 1892 | 4,920 | — |
| Total (six ships)..... | | 49,969 tons. | |

ATLANTIC TRANSPORT LINE.

| Vessel. | Year | Tons, gross. | Speed, knots. |
|-----------------------------------|------|---------------|---------------|
| Mesaba..... | 1898 | 6,833 | 15 |
| Manitou..... | 1898 | 6,849 | 13.5 |
| Menominee..... | 1897 | 6,919 | 13.5 |
| Marquette..... | 1898 | 7,057 | 13.5 |
| Minneapolis..... | 1900 | 13,401 | 16 |
| Minnehaha..... | 1900 | 13,401 | 16 |
| Minnetonka..... | 1901 | 13,398 | 16 |
| Maryland..... | 1886 | 2,863 | — |
| Mackinaw..... | 1891 | 3,204 | — |
| Minnesota..... | 1887 | 3,216 | — |
| Montana..... | 1887 | 2,840 | — |
| Mohawk..... | 1885 | 4,212 | — |
| Manhattan..... | 1898 | 8,004 | — |
| Michigan..... | 1898 | 8,001 | — |
| Europe..... | 1891 | 5,302 | — |
| America..... | 1891 | 5,158 | — |
| Total (sixteen ships)..... | | 109,658 tons. | |
| Grand total (eighty-three ships). | | 688,973 tons. | |

THE WORLD'S FASTEST SHIPS.

| | Date. | Tons, gross. | Speed, knots. |
|---------------------------------|-------|--------------|---------------|
| BRITISH (thirty ships) :— | | | |
| Anglia..... | 1900 | 1,862 | 21 |
| Arundel..... | 1900 | 1,130 | 21 |
| Banshee (pad.)..... | 1884 | 1,250 | 20 |
| Britannia (pad.)..... | 1896 | 459 | 20 |
| Cambria..... | 1897 | 1,842 | 21 |
| Cambria (pad.)..... | 1895 | 420 | 20 |
| Campania..... | 1893 | 12,950 | 22 |
| Connaught..... | 1897 | 2,632 | 23.5 |
| Empress Queen (pad.)..... | 1897 | 2,140 | 22 |
| Etruria..... | 1884 | 8,120 | 20 |
| Hibernia..... | 1900 | 1,862 | 21 |
| Isis..... | 1898 | 1,728 | 21 |
| King Edward (turbine)..... | 1901 | 562 | 20.5 |
| La Marguerite (pad.)..... | 1894 | 2,205 | 20.5 |
| Leinster..... | 1897 | 2,632 | 23.5 |
| Lucania..... | 1893 | 12,952 | 22 |
| Majestic..... | 1889 | 9,965 | 20 |
| Munster..... | 1897 | 2,632 | 23.5 |
| Oceanic..... | 1899 | 17,274 | 21 |
| Osiris..... | 1898 | 1,728 | 21 |
| Prince of Wales (pad.)..... | 1887 | 1,657 | 21 |
| Queen Alexandria (turbine)..... | 1902 | 690 | 20.5 |
| Queen Victoria (pad.)..... | 1887 | 1,657 | 21 |
| Reindeer..... | 1897 | 1,281 | 20 |
| Scotia..... | 1902 | 1,872 | 21 |
| Sussex..... | 1896 | 1,117 | 21 |
| Teutonic..... | 1889 | 9,984 | 20 |
| Ulster..... | 1897 | 2,632 | 23.5 |
| Umbria..... | 1884 | 8,128 | 20 |
| Westward-Ho (pad.)..... | 1894 | 438 | 20 |
| BELGIUM (six ships) :— | | | |
| Leopold II. (pad.)..... | 1892 | 1,367 | 22 |
| Marie Henriette (pad.)..... | 1893 | 1,451 | 22 |
| Princess Clementine (pad.)..... | 1896 | 1,474 | 22 |
| Princess Henriette (pad.)..... | 1888 | 1,094 | 21 |
| Princess Josephine (pad.)..... | 1888 | 1,107 | 21 |
| Rapide (pad.)..... | 1895 | 1,195 | 21 |
| FRENCH (seven ships) :— | | | |
| France..... | 1899 | 729 | 21 |
| La Lorraine..... | 1900 | 11,200 | 21 |
| La Savoie..... | 1900 | 11,200 | 21 |
| Le Nord (pad.)..... | 1898 | 2,004 | 20 |
| Le Pas des Calais (pad.)..... | 1898 | 2,004 | 20 |
| Manche..... | 1897 | 978 | 21 |
| Tamise..... | 1893 | 953 | 21 |
| GERMAN (four ships) :— | | | |
| Deutschland..... | 1900 | 15,500 | 23 |
| Kaiser Wilhelm der Grosse..... | 1897 | 14,349 | 22 |
| Kaiserin Maria Theresia..... | 1890 | 8,278 | 20 |
| Kronprinz Wilhelm..... | 1901 | 15,000 | 23 |
| DUTCH (three ships) :— | | | |
| Koningin Wilhelmina..... | 1895 | 1,943 | 20 |
| Koningin Regentes..... | 1895 | 1,947 | 20 |
| Prins Hendrik..... | 1895 | 1,945 | 20 |
| RUSSIAN (two ships) :— | | | |
| Moskva..... | 1898 | 7,267 | 20 |
| Smolensk..... | 1901 | 7,270 | 20 |
| AMERICAN (four ships) :— | | | |
| New York..... | 1888 | 10,674 | 20 |
| Philadelphia..... | 1889 | 10,669 | 20 |
| St. Louis..... | 1895 | 11,629 | 21 |
| St. Paul..... | 1895 | 11,629 | 21 |

The Havana floating dry dock is to be taken to the navy yard at Pensacola for repairs. This is about all that the government has been doing with it since it was bought from Spain.

NEWS OF THE GREAT LAKES

LICENSED STEAMBOAT OFFICERS.

They must answer pertinent questions in trials before Inspectors—Danger of losing licenses not an excuse—Opinion of United States Attorney General.

It will be remembered that while the strike of employes of the Great Lakes Towing Co. was under way during the greater part of the present season of navigation on the lakes, the towing company, represented by Attorneys Goulder, Holding & Masten of Cleveland, instituted proceedings against some of the licensed tug men before several of the local boards of steamboat inspectors, charging them with having violated the laws under which their licenses were issued and with having subjected themselves to revocation of license. The proceedings before local inspectors were suddenly brought to an end by the tug men simply refusing to answer questions material to the inquiry, on the ground that their answers might subject them to the penalties of the law. In this they were supported by an opinion from the solicitor of the treasury. Fortunately the strike is at an end and the questions involved do not now interfere with the settlement made between the Great Lakes Towing Co. and its employes, but the attorneys of the towing company, knowing that the inquiry was one of great importance and needed settlement for the future, followed the matter up. It was taken before the secretary of the treasury and through him submitted to Attorney General Knox. The attorney general now reverses the ruling of solicitor of the treasury in the following opinion:

Department of Justice,
Washington, D. C., Oct. 18, 1902.

The secretary of the treasury: Sir—Your communications of Aug. 26 and Sept. 17 submit to me the following facts and questions of law arising thereon, with a request for my opinion:

In a certain investigation before United States local inspectors of steam vessels, respecting a number of duly licensed pilots and engineers, who, it was alleged by certain vessel owners, had violated section 4449 of the revised statutes, several of these licensed officers refused to answer questions propounded to them, on the ground that their answers might tend to subject them to revocation of their licenses as provided by section 4449, and that to furnish the information called for by the questions would be a violation of their obligation to the protective union of tugmen to which they belong, this organization having issued a strike order which affected the service of licensed pilots and engineers on a large number of steam tugs. It seems that other licensed pilots and engineers, not under investigation but called as witnesses, refused to answer questions propounded to them on similar grounds, some witnesses simply refusing to answer. The questions of law arising are as follows:

1. When a licensed officer is duly summoned to give testimony before this board (the local board of inspection service) in a hearing, and refuses to answer questions which are in the opinion of the board material and proper, has the board authority to compel answer under penalty of suspension or revocation of the witness's certificate of license, or otherwise?

2. Has the licensed officer who is charged with violating section 4449 of the revised statutes, and is on hearing before this board on such charge, the right to refuse to answer a question material to the inquiry, on the ground that his answer may subject him to the penalty of section 4449?

It appears that the solicitor of the treasury, on a reference of the subject by you, has rendered opinions answering the first inquiry in the negative and the second in the affirmative.

The entire plan of government control over this branch of commerce and its instrumentalities, as shown in title LII., revised statutes, is based upon public interest in "the better security of life," justifying the creation of a special government service regarding the management, navigation and inspection of seagoing vessels and vessels engaged in trade on the great lakes and other waters of the United States. The theory of the matter and the function of the government in protecting the people of this semi-public service require, and the law accordingly imposes, burdens upon vessel owners with corresponding rights or privileges, and qualifications or restrictions upon the specially skilled men who navigate and operate vessels. These conditions, operating to limit the number of those qualified and licensed, constitute also an advantage to the men actually in the service. Only licensed officers may be employed (section 4438). These correlative burdens and benefits are enforced by a system of penalties ranging from the revocation of licenses and trifling fines to fines clearly penal and imprisonment under those provisions of title LII. which are manifestly criminal. The investigations of the boards of inspection cover different aspects of the rela-

tions existing and the transactions arising in this maritime and quasi-government service, and may be conducted, as they constantly are conducted, upon the government initiative or upon the complaint or suggestions of private parties and vessel owners. And it is apparent that vessel owners themselves, as well as members of the special licensed service, are subject in various contingencies to investigation and possible penalty, more or less serious. For the crimes and misdemeanors which these laws define—that is, for all the more serious offenses—a regular course of procedure through the criminal courts, or for the recovery of penalties or forfeitures through judicial proceedings, is provided. And within the jurisdiction of the inspection boards either for arriving at a finding of the real facts as to many different occurrences, in order to inform the administrative arm, or for maintaining the freedom and efficiency of the navigating side of the service by disciplinary and corrective measures, the law provides for appeal and review of the findings or action of the tribunal of first instance (section 4452; and see also section 5294 as to remission of penalties.)

Thus, that licensed officers constitute a special service, peculiarly related to the government, if not of the government, is evident not only from irresistible conceptions drawn from the entire body of these laws, but from such provisions as the act of May 28, 1896, amending section 4131, revised statutes, and adding other provisions. This law brings out very clearly the inter-relations of the government, vessel owners, and the skilled men employed aboard vessels, and the way in which benefits and privileges, on the one hand, and burdens and restrictions on the other, interdepend among the different interests, by the requirements that a vessel shall be wholly owned by a citizen of the United States or by a corporation created under the laws of a state, shall be commanded by a citizen of the United States, and that all watch officers, including engineers and pilots, shall be native born or fully naturalized citizens; and by their exception from liability to draft in time of war, and by the right of pension conferred, based upon the duties performed under the license in the military service of the United States. Consequently, in whatever way investigation of owners or employes may arise, since full opportunity for review of administrative proceedings and action is given, and the more serious charges must go to judicial trial, the suggestion is reasonable and logical that no other allegiance of owners to possible associates, or of licensed men to labor organizations, can interfere with the different measures of control over them, respectively, justly exercised by the government.

Passing on, then, from this review of the policy and general meaning of the law, we take up the exact question presented as to the right of licensed officer to refuse to answer questions put to him in the course of a regular investigation by a board of inspectors, on the ground that he may thereby subject himself to penalty by way of revocation or suspension of his license.

Section 4449, revised statutes, provides that "if any licensed officer shall, to the hindrance of commerce, wrongfully or unreasonably refuse to serve in his official capacity on any steamer, as authorized by the terms of his certificate of license, or shall fail to deliver to the applicant for such service at the time of such refusal, if the same shall be demanded, a statement in writing assigning good and sufficient reasons therefor, or if any pilot or engineer shall refuse to admit into the pilot house or engine room any person whom the master or owner of the vessel may desire to place there for the purpose of learning the profession, his license shall be revoked, upon the same proceedings as are provided in other cases of revocation of such licenses."

The local boards of inspectors are directed by congress to "investigate all acts of incompetency or misconduct committed by any licensed officer while acting under authority of his license, and shall have power to summon before them any witnesses within their respective districts, and compel their attendance by a similar process as in the United States circuit or district courts; and they may administer all necessary oaths to any witnesses thus summoned before them; and after reasonable notice in writing, given to the alleged delinquent, of the time and place of such investigation such witnesses shall be examined, under oath, touching the performance of his duties by any such licensed officer; and if the board shall be satisfied that such licensed officer is incompetent, or has been guilty of misbehavior, negligence or unskillfulness, or has endangered life, or wilfully violated any provisions of this title, they shall immediately revoke or suspend his license (section 4450)."

Under section 4445 every licensed officer must make oath

"that he will faithfully and honestly, according to his best skill and judgment, without concealment or reservation, perform all the duties required of him by law."

These boards are thus created courts, and exercise judicial functions; they have power to summon witnesses, compel their attendance by similar process as in the United States courts, administer oaths to the witnesses summoned, and if upon examination the boards are satisfied as to the incompetence or guilt of the licensed officer on trial, they may pass sentence on him by revoking or suspending his license. It follows therefore that persons summoned to appear as witnesses before such boards are entitled to the privileges and subject to the obligations attaching to witnesses in any regular court. A refusal on the part of a witness to answer a proper question pertinent to the issue before a court is a contempt. The board of inspectors, with its power to summon witnesses, compel their attendance, etc., exercises the functions of a court, and the power to punish for contempt is inherent in all courts. "Its existence is essential to the preservation of order in judicial proceedings, and to the due administration of justice." (Ex-parte Robinson, 19 Wall, 505). "The power to punish for contempt is inherent in the nature and constitution of a court. It is a power not derived from any statute, but arising from necessity, implied, because it is necessary to the exercise of all powers." (Cooper's case, 32 Vt., 253, 257; cited in ex-parte Terry, 128 U. S., 289, 303). Now, while the power may not be absolute in this special tribunal, which is not given the right to impose fines or imprisonment for any disobedience to its authority, nevertheless the principle may be invoked so far as the special service and the special discipline go.

That a witness may refuse to answer a question where it reasonably appears that such answer will have a tendency to expose him to a penal liability or to any kind of punishment, or to a criminal charge, is well settled and needs no citation of authorities. It has also been held that it is the privilege of a witness to refuse to answer questions which may have a tendency to expose him to a penalty or forfeiture. (1 Greenleaf on Evidence, section 453; Story Eq. Pl., section 607, 846; Johnson vs. Donaldson, 18 Blatch., 287; and see cases cited in 29 AM. & Eng. Enc., p. 836). Is the revocation of a license such a "penalty" as would entitle the witness to the benefit of this rule? While in the general sense it may be considered a penalty, it can not be so understood in a legal sense, and would not fall within the definitions of the word given by the courts. "The words 'penal' and 'penalty' have been used in various senses. Strictly and primarily, they denote punishment, whether corporal or pecuniary, imposed and enforced by the state, for a crime or offense against its laws. But they are commonly used as including an extraordinary liability to which the law subjects a wrongdoer in favor of the person wronged, not limited to the damage suffered." (Huntington vs. Attrill, 146 U. S. 657, and cases cited therein).

The authorities holding that a witness may refuse to answer a question tending to expose him to a penalty or forfeiture appear to be mainly cases involving violations of penal statutes. Section 4449 is a remedial, not a penal, statute, and the revocation of a license therein provided for may be viewed, not in the light of a punishment for an offense committed, but rather as a remedy placed in the hands of the board of inspectors to ensure greater efficiency in the steamboat inspection service, and to guard against obstructions of or injury to commerce, etc. Furthermore, even where a disability or liability is held generally equivalent to a penalty or forfeiture, a distinction is taken if the discovery subjects the defendant to a liability of this general nature *in consequence of his own agreement*, and there he is compelled to answer; and the cases mainly relate to liabilities which, though not criminal, eventually amounted to forfeiture or punishment, because they led to the actual forfeiture of the estates. (Bird vs. Hardwicke, 1 Vern., 109, and note 1). So that the authorities fully justify us in keeping this special remedial discipline separate from the notion of criminal penalty or forfeiture.

It might, of course, happen, as suggested by the solicitor of the treasury in his opinion dated June 19, 1902, that on trial of a licensed officer before the board for a violation of section 4449, questions might be put, which, if answered, would disclose facts showing that the officer had incurred a penal liability for which he was liable to indictment and punishment, as under section 4437. In such a case the officer would be entitled to his refusal to answer. But this has nothing to do with the present inquiry, which is confined to refusal on the ground that the officer may be subject to the penalty under section 4449—the revocation or suspension of his license. It seems to me that a delinquent inspector (see section 4406, 4407) might with as much force decline to answer a question on the ground that to do so might lead to his removal, as a licensed officer decline to answer inquiries because of the danger incurring the statutory discipline or penalty. Under the peculiar relations of this service, it might reasonably be said that refusal to respond to inquiries was in itself just cause influencing the executive discretion to remove an inspector or revoke the license of an engineer, pilot, etc. Surely the power is plenary in this service to determine whether a licensed officer has wrongfully or unreasonably refused to serve; and any

obstruction of investigation must necessarily call down the summary corrective power, subject to the right of review. If this is not true, the policy of this law is vain and its terms futile to carry out its theory and intent. The refusal to answer amounts to or may conceal the bad conduct, inattention to duty, or misbehavior (if wilful violation of the law is excluded from present consideration), which sections 4439, 4442 and 4450 specify, *inter alia*, as grounds for suspension or revocation of license.

So broad and far-reaching is the view of "misconduct" that a ruling of the treasury department, dated July 27, 1893, based upon an opinion of the solicitor of the treasury, dated June 6, 1893, holds that a certain objectionable agreement between individual pilots and a brotherhood of pilots amounts to hindrance to commerce and for this reason renders licensed officers who are parties justly liable to suspension or dismissal by revocation of their licenses, without any further act of "misconduct" on their part. If such is the established executive view, I think it follows as a logical necessity in administration that "misconduct" may also cover a refusal to answer pertinent questions, because, among other reasons, they might point to a similar agreement. That seems to be the point as to the obligation to the protective union.

It is suggested that a licensed officer thus under investigation is liable to be deprived of his office together with salary and emoluments belonging to the same, and that for this reason he is entitled to refuse to answer a question which has a tendency to expose him to a penalty of forfeiture; but that suggestion, indeed, begs the question, and the authorities cited in support of it refer to consequences which were undoubtedly penal.

In short, it is not too much to say that paramount considerations of the good of the service require that a licensed officer shall not be permitted to withhold any information material to an inquiry affecting the service and yet remain a member of that service.

The foregoing reasons of law and legal policy, therefore, in my opinion, require me to answer your first question in the affirmative and your second question in the negative, and I so answer.

Very respectfully,

(Signed) P. C. KNOX,

Attorney General.

MISCELLANEOUS MATTERS.

The report of the Crucible Steel Co. for the year ended June 30, 1902, shows net profits of \$3,552,467, against \$3,490,000 in the preceding year. Rueben Miller, president of the company, says: "There is no doubt but that this amount would have been greater had the company been able to secure prompt delivery of raw material ordered and contracted for. This, and the delays incident to severe congestion of freight traffic, for both incoming and outgoing product, has reduced the aggregate output for the year by at least 50,000 tons."

Reports of the decadence of Great Britain as a commercial country do not appear to be borne out when the figures become available. Following are the totals of the registered tonnage entered last year at the ten principal European ports: London, 15,952,000 tons; Liverpool, 9,704,000; Cardiff, 9,290,000; Hamburg, 8,383,000; Antwerp, 7,483,000; Paris, 7,180,000; Rotterdam, 6,382,000; Marseilles, 6,531,000; Glasgow, 3,757,000; Hull, 3,102,000. This is an increase in every case over the figures of 1900 and shows Britain to be occupying a leading place with three of its ports.

As a matter of interest it may be said that the British government last year paid \$5,700,000 to various shipping companies for services rendered, as against \$8,900,000 paid by France, \$2,200,000 paid by Germany, \$1,800,000 paid by Russia and \$1,700,000 paid by the United States. Of the sum paid by the United States \$100,000 went to the North German Lloyd Line, \$35,000 to the Hamburg-American Line, \$234,000 to the White Star and Cunard Lines, and the balance to the American Line. The British and American subventions were for postal services with the exception that out of the British total \$350,000 went for admiralty subsidy. It will be seen that there are not enough ships flying the American flag to earn the modest sum which the United States government pays for its mail service.

The executive committee of the Lake Carriers' Association met in the office of Mr. J. C. Gilchrist at noon on Tuesday, to consider plans drawn by the city engineer's department for the placing of a Cowing lift bridge on the Superior street viaduct, Cleveland, in place of the present swing bridge. The plan, of course, involves the removal of the center pier in the river, which is its great advantage. However, it also involved an encroachment upon the present abutments, which, owing to the abrupt turn in the stream at this point, was not looked upon with favor. Mr. Harvey D. Goulder was instructed to reply to the city engineer's department to the effect that the removal of the center pier would be a great advantage, but that as long as the city contemplated making so extensive an improvement it might go a little further and make one that would be sufficient for all time. This could readily be done by moving back the west abutment and altering the location of the draw so as to permit an unobstructed channel 400 ft. wide.

INVITATION TO PRESIDENT ROOSEVELT.

When President Roosevelt was in Detroit recently, Mr. Wm. Livingston, president of the Lake Carriers' Association, had the pleasure of seeing much of him. Mr. Livingstone was one of the citizens of Detroit selected to entertain the president. During a trip on the Detroit river the president manifested great interest in the little that he saw of lake shipping. Mr. Livingstone took advantage of the opportunity to suggest that the president take a trip up the lakes next summer. The president's reply was a tentative one. He did not say that he would or would not go, but left it to be inferred that, if circumstances permitted, it was such a trip as he should like to make. No suggestion could have been more pertinent than Mr. Livingstone's. The matter will be taken up shortly by the executive committee of the Lake Carriers. A trip up the lakes is such a one as the average man, were he the president of the United States, would like to make. It is a peculiarly appropriate trip for the president of the United States to make. No man can tour the length and breadth of that mighty chain of waters and ever be the same man again. It is impossible. His eyes will have been opened, his vision broadened and he will have received impressions from which it will be impossible for him ever after to escape. It is a phase of American life that the chief executive of the nation should be intimately acquainted with. It is far more essential that the president should make such a trip as this than that he should busy himself with the things that usually call the chief executive from Washington, such as attendance upon functions which are purely social in their nature and which are usually projected for the gratification of the town's vanity. A trip up the lakes is an acquaintanceship with the vastest movement of commerce ever known, with a coming and going of ships whose shuttlecock regularity mark the temperature pulse strokes of the nation's industrial life and without whose precious freight the furnaces of the country would be blanketed and the mills idle. The blue waters of the St. Clair river carry the greatest load of freight that passes any point on the globe. The ships aren't pretty; they are merely beasts of burden; but they have specialized their work and they handle it with a dispatch that is unknown elsewhere. Nothing simpler or more economical can be imagined than the handling of bulk freight on the lakes, but it must be seen to be appreciated. This economy is due to the improvement of channels, by widening and deepening them and by lighting them thoroughly. The money thus spent by the government has returned to the nation by enabling it to meet the competition of all countries. It is pertinent that the president of the United States should have a visual acquaintanceship with all this, for bills are coming before him constantly which to intelligently endorse he should thoroughly understand. That understanding can be better arrived at to his own satisfaction by a personal visit than by any other known method.

Moreover a crisis is approaching in the affairs of the Lake Carriers' Association and it is well that there should be an informed and impartial arbiter in Washington. The association in its original organization embraced a great number of individual interests, none of them so large as to be conspicuous among its fellows. Now through consolidation and purchase two interests, which are diametrically opposed to each other, dominate. One is interested in low freights and the other in high freights. One of them has the bugaboo name of trusts—in this instance an utterly unmeaning title—but nevertheless known as a trust, calculated to frighten timid congressmen and to make the jingo livid with indignation even when legitimate claims are presented. It is clear that so long as this hostility exists and so long as congressmen have one eye on legislation and the other on their constituents the Steel Corporation, will be a poor supplicant for congressional favor. Yet the Steel Corporation has far and away the greatest investment of any interest on the great lakes, and any government service which permits it to facilitate the translation of ore from the mines to the furnaces, tends to that degree to add to the wealth and comfort of the whole country. Therefore, as Mr. Roosevelt is our chief magistrate, let him come and see that part of his domain which is filling all the rest of the country with the red blood of iron.

Maj. Symons, United States engineer at Buffalo, has received notification from the light house board that all the recommendations in regard to the building of dwellings for the keepers of stations in and near Buffalo have been approved. They include a double dwelling for the keepers of the Horseshoe reef light at the head of Niagara river at a cost of \$5,000; one for the keeper of the Buffalo depot at a cost of \$3,500 and a double dwelling for the keepers of the breakwater light at a cost of \$5,500.

About Oct. 24 lights located on the southerly end of the breakwater at Milwaukee, which have been suspended on a brown iron column, will be shown from an enclosed structure on the southerly end of the breakwater. The characteristics of the lights will remain unchanged, but the height of the red light will be increased to 39½ ft. above mean lake level, and that of the white light to 31 ft. above the same level. The structure is a white hexagonal pyramid, surmounted by an hexagonal shaft having two glazed belts, forming the lanterns, and surmounted by a dome.

DULUTH'S SUPREMACY AS A FLAX MARKET.

Duluth, Oct. 22.—Chicago in its palmiest days as a grain market never did one half the flax business that Duluth is doing now. Receipts of flax at the head of the lakes the past week have been 2,083,000 bu., which surpasses any similar period on record anywhere. Shipments are 13,343,000 bu. There are now in store at the Duluth-Superior elevators 1,794,004 bu. of flax, showing how close shipments keep to receipts. During the past week sales have run from 1,000,000 to 2,000,000 bu. daily, and immense quantities have been taken for shipment east to domestic and European crushers. The receipts of flax have been larger the past week than those of wheat, largely on account of the fact that farmers are not anxious to market their wheat at present price and do want to move their coarse grains. The position of Duluth as the chief flax market of the United States is stronger now than ever.

West Superior is making a strong effort to establish a Wisconsin grade of wheat, to the end that that city can re-establish its grain market, which has fallen into a comatose condition the past few years. The plan is to have Minnesota inspection replaced by an inspection that will be jointly Wisconsin and North Dakota, and that will be established by the legislature of the latter state, no legislation being needed from Wisconsin, it is claimed. West Superior claims that this grade would net the farmers 5 cents a bushel at the least over the present Minnesota inspection. Superior interests claim that their elevators and flour mills are of little advantage to them if they cannot get the business connected therewith, by that meaning the selling of grain and what advertising they think will come from the publication of figures as of Superior, rather than as of Duluth. The real value of this advertising is a debatable question; as towns grow they lose interest in that sort of business.

Messrs. Gooding and York, United States inspectors of steam vessels, are taking testimony in the claim of the Lake Captains & Pilots Association, Houghton branch, in the matter of the licenses of J. A. Prior, Jr., of Houghton, who, it was claimed, violated section 4445 of the revised statutes in taking an examination, and worst of all in passing it with the highest credit though not a member of the association. The case presents some interesting features.

The steamer Ottawa, of the Canadian Atlantic Line, which went aground off Port Arthur a week ago, was aground a full week before being released, and then got off only by lightering into the Myles. During the week a channel was dredged around the Ottawa and five tugs and three of the Port Arthur dredges pulled on the ship in a fruitless attempt to get her into this channel.

By a new unloading device just installed in the J. C. King elevator at Port Arthur, four men will unload 125 80,000-lb. cars of wheat into the house in ten hours, about double the results with the same number of men under former methods.

There has been very little private dredging or dock building at the head of the lakes this year and the probabilities for the coming year are not for any great amount, unless the Northern Pacific, which has dredged out the west side of Rice's point for a length of a mile and a half, with the intention of ultimately improving it with slips and docks, goes ahead at once. This Northern Pacific work, with the new coal dock of the Northwestern Fuel Co., have been the largest jobs of the year. The former has rebuilt all its yards and trackage on Rice's point, and now has a capacity there, in what is claimed to be the most modern yard in the world, for 2,200 cars. The yard is about half completed. When warehouses and slips are erected there they will be designed especially for transcontinental traffic. There is talk of the erection of a grain elevator or two at Duluth, and the Great Northern will build an addition to its ore shipping piers at Superior.

A GREAT IRON ORE MINE—THE STEVENSON.

When returns as to mining operations in the Lake Superior region are completed this season the great surprise will be the Stevenson mine of the Mesabi range, owned by Corrigan, McKinney & Co. of Cleveland. Barring disaster of some kind this mine will ship 1,400,000 gross tons of ore. More than 1,100,000 tons has already been moved. James Corrigan went into a wilderness and opened it up when it was passed by the big organizations as something that would keep. It will make him very rich. His estimate of ore in the property is 12,000,000 tons. Others put it much higher, even as high as 20,000,000 tons. The lease from the Eastern Railway of Minnesota is for fifty years. The royalty is only 12½ cents. At a rough guess there is probably \$1 a ton profit in the ore on this year's price, with every indication of a higher price next year. When it was said early in the present season that 1,300,000 tons of ore to come from this mine had been sold, the statement was ridiculed and it was the general opinion that if engagements to that extent had been made the mine was greatly oversold. Now there is every assurance of shipments of 1,400,000 tons. Of course it was natural that this output should not be expected, as the mine was not fully opened up until late last year and the shipments last year footed up only 666,000 tons.

LAKE SHIP YARD MATTERS.

It is understood that the Dunkley-Williams Co., which has just contracted with the Craig Ship Building Co. of Toledo for a 20-mile screw passenger steamer to run between Chicago and South Haven, Mich., is to have competition in this special fruit and passenger trade. Capt. Pereue of South Haven is figuring with the Jenks Ship Building Co. of Port Huron for a steamer somewhat larger than the one that is to be built at Toledo for the Dunkley-Williams Co. The steamer to be built at Port Huron is to be of the twin-screw type and also of 20 knots speed. The Dunkley-Williams steamer is not yet fully designed as to detail. She will be in a general way similar to the Puritan, which the Craigs recently built for the Graham & Morton Transportation Co. of Chicago, but will be a little larger and will have more staterooms. She is to be christened City of South Haven and is promised for June 1, 1903. She will be first-class in every respect.

The Ship Owners Dry Dock Co. of Chicago, made some very quick repairs on the City of Rome. They estimate that they have saved one week in time over that usually required on such a job, by means of the compressed air tools and other methods of work employed. They put in a new stern, new forefoot, part of her keel, new garboards and several new planks, beside calking all over. The garboards were 8x22 in. by 50 ft. In order to bend them quickly the steam box was moved into the bottom of the dry dock, so that the boards would not cool off before they could be bent. The old fastenings were of 1 1/8-in. iron and these were cut off and the new holes bored and the garboards fastened with the air tools. The steamer Neshoto was also in dock for 50 ft. of new keel, garboards and bottom planking. The owners estimated it as a ten days' job, but it was done in five. The City of Kalamazoo is now at the yards getting new steel side arches 7/16x20 in. by 130 ft., and other general repairs. The company is more than pleased with the dispatch obtained with the new air tools, as it enables vessel owners to get their repairs done in much less time than is usual with wooden vessels, and the point is one that will be generally appreciated as soon as it is known.

It is reported that the Merchants Line of Montreal, operating between Toledo and Montreal, has decided to build two screw steamers of Canadian canal dimensions. Although the boats of this line have for several years been too old for the service in which they are engaged, and in many respects inadequate, they have been well patronized and have probably made money. New steamers could not be built on the lakes for next season, on account of the crowded condition of the ship yards, but it is said that the Montreal company proposes to go to England for the vessels.

The American Ship Building Co. has applied to the board of control of the city of Cleveland for the privilege of purchasing four acres of land at the foot of Waverly avenue adjacent to its dry docks. The company offered \$10,000 for the land and desires it for the purposes of extending its works. The land is a part of that reserved for park purposes, but, owing to the encroachment of business and its undesirability for purposes of pleasure, it has never been incorporated into Edgewater park. The matter was referred to the city engineer. It is practically assured that the land will be sold to the ship building company.

Detroit is not to have all of the money that will be spent within the coming year in improvements at works of the American Ship Building Co. An enlargement of the South dry dock at Milwaukee was authorized at a meeting of officials of the company held in Chicago a few days ago. The dock is to be made very large—600 ft. long and 70 ft. wide—with 16 ft. of water over miter sill. The work of enlargement will begin as soon as possible.

Supt. Nevins of the Buffalo works of the American Ship Building Co. says that steel is beginning to arrive for the two new steamers to be built for the Wolvin Canadian fleet and that the prospects are bright for laying the keels soon. Three hundred tons of material is already on hand and 250 tons are in transit. Keels for both steamers will be put down simultaneously. Extensive improvements are now under way to put the plant in the best possible condition.

ERIE CANAL ENLARGEMENT SEEMS ASSURED.

Buffalo, Oct. 21.—The canal men are taking a new step in their campaign now, from the confidence born of their success in forcing both parties to put strong canal planks into their platforms. At first the Republican action was not satisfactory, but Gov. Odell settled that by two very significant utterances. In his acceptance of a renomination he declared that he had no hesitation in advocating the 1,000-ton barge canal and in his first address of the campaign he said that a political promise should be kept just as sacredly as one made to an individual. As the Democrats had already declared for the 1,000-ton barge canal in their platform it left really nothing for the canal men to do but to go on and outline the work leading up to the actual enlargement.

It is not often that a special movement is carried to success before the rest of the campaign is fairly opened, especially one of this sort, and one that is known to have a great cloud of enemies trying to drive it out. The railroad and farmer element is still pretty strongly opposed to canal improvement, but the movement

has shown its strength in such an unmistakable way that it cannot be beaten now. Woe to the party in office that tries such a policy hereafter.

So the new canal is accepted as a fact, though the routine work to be done will still be large. It will not need to be said that the work will be attended to. Two years ago, or even one, the canal cause was such a doubtful one that not a few of its old adherents had given up hope. They thought it was impossible to convince the people of the importance of maintaining the canal. They know now that there were people who had the courage of their convictions and they have all returned to the side of the majority. The canal is on both tickets in large letters.

Much dignity to the campaign for the canal has been lent by the enlightened advocacy of the enlargement by Maj. Symons, the resident government engineer. What he said was felt to be without any possible bias or self-interest. It was a dispassionate opinion of a trained engineer and student of such subjects as had to do with commerce by land and water. It is a matter of special congratulation, then, to the canal advocates to find that he has written an article since the state conventions, giving his reasons for the course he had taken. The great point made is that the canal will connect forever, beyond the reach of railroad interference, not only the lakes and the ocean, but the two cities of this state that are to be, as he predicts, the commercial and the manufacturing centers of the country. In this connection let me turn aside from the primary point of my subject a moment and note that within a day or two I have been told that one of the later electrical companies at Niagara Falls, one of four that are engaged in a race to develop power, on account of the demand for it, is preparing to put \$30,000,000 more into its equipment before long. This is a side remark, but it shows what the certainties are, while it outlines the possibilities much farther.

It seems too bad that either of the opponents of the canal should fail to see in it the advantages to himself as well as to others, the farmer in great home markets and the railroad owner the carrying trade, urged forward and built up by concentrated energies that are already springing into commercial and manufacturing activity such as have not hitherto been known. It would be very strange if these two opposing elements would not benefit now just as they did when the canal was first built.

Although the Champlain canal was not included in the original scheme of enlargement it is felt that it is needed almost as much as the main line and it is at once to be taken up and included in the general scheme of establishing water connection of the larger dimensions to the St. Lawrence and Montreal.

They tell us that it will cost a matter of \$100,000,000 to enlarge the Erie canal system as it demands and they add that New York can pay this cost in fifty years and not know it. We believe that in a small part of that period the wisdom of the step will be quite as apparent to everybody as the advantage of the original building of the canal is now.

JOHN CHAMBERLIN.

MR. CLERGUE ON DETROIT'S OPPORTUNITIES.

Secretary Walter H. Campbell of the Merchants & Manufacturers' Exchange of Detroit lately sent a letter to Mr. Francis H. Clergue inviting him to speak at a coming meeting of the exchange upon the subject, "Detroit and its Opportunities." In his reply regretting his inability to be present Mr. Clergue said:

"I this morning received your invitation to address the Merchants & Manufacturers' Exchange at their banquet during the last week of October. I regret I have been obliged to wire you that serious duties here will prevent my leaving my work for the next two months. We are now making every effort to conclude the most of our construction before winter, and so much of my personal attention is necessary that I am obliged to decline your very kind invitation. I have always been an enthusiast over Detroit's opportunities and when I recently learned that the people of Detroit had allowed non-residents to become responsible for the inauguration of a blast furnace I felt obliged to inform them that in my judgment they had given over to others a most profitable business opportunity. A steel and iron industry on a large scale established at Detroit would, in my judgment, be one of the most successful in the United States, and in a few years would return to its shareholders its entire capital stock. I think every citizen of Detroit with \$100 uninvested should take advantage of an opportunity to invest it in this industry, if organized under a sufficient scale. Ten million invested in this industry, under good management with the modern devices that could be secured, would earn as much as three times the amount of their capital invested in the United States Steel Corporation, while affording employment to a small army of new citizens. I would be very glad to talk of Detroit and its opportunities as viewed from the standpoint of an observing outsider, but cannot take advantage of this chance, much to my regret."

All ore loading records were broken at Ashland this week when 5,202 tons of ore were loaded into the James H. Hoyt at the Chicago & Northwestern docks in 1 hour and 8 minutes, an average of 80 tons a minute. In fact the cargo was let into the hold and the lines cast off almost before the engineer had found time to get the water ballast out of the vessel.

WHY NEW YORK SHOULD MODERNIZE THE ERIE CANAL.

In response to a request for his views from the New York Journal of Commerce as to why New York should modernize her canal, Maj. Thomas W. Symons, the government engineer at Buffalo, has written the following reply:

"You ask me to give the reasons for my belief in the enlargement of the Erie canal, taking into consideration that 'conditions in transportation have greatly changed' and 'many of the old arguments favoring a canal are now obsolete.' My answer is that while it is true that certain conditions have changed, these do not affect the fundamental basic truths of the science of transportation any more than improvements in arms affect the basic principles of the science of war, and if some of the old arguments favoring a canal are obsolete new ones can be advanced of equal and even greater force. One of the fundamental truths is that trade will follow the cheapest routes all things considered, and New York, by not furnishing the cheapest route for the business of the west and northwest, has lost immensely in her business relatively to other ports. She can get back some of her relative loss, but she can only do it by furnishing cheaper transportation than her neighbors. It is perfectly evident that the railroads cannot and will not give her this cheaper transportation—on the contrary, they discriminate against her. The only way that she can get this cheaper transportation is by establishing a highway on which business can be done at a lower cost than by any existing routes to rival ports, and one independent of railroads and railroad combinations. The only highway which will fulfill the requisite conditions is a large barge canal with all modern and up-to-date improvements. The change in the relative importance of railroad and canal transportation from forty years ago to the present is due fully as much to the lack of change in the Erie canal as it is to the great changes which have taken place in the railroads. It is a great mistake to think that water transportation has had its day and will be fully superseded by railroads.

"In the region of the great lakes the struggle between railroad and water transportation has been fierce and strong, but water transportation has fully held its own, and the waterborne commerce of the lakes is almost one of the wonders of the world. The narrow passage between Lake Huron and Lake Erie is the greatest throat of commerce on earth. The future of lake commerce is as bright and unclouded as any business well can be. All this is due to the fact that the lakes and their connecting waterways have been improved from time to time by deepening and widening channels and building canals and locks, so that the vessels of the lakes and all lake facilities could keep pace with railroads and with almost everything else. Without these improvements the lake commerce would have been unable to keep pace with the railroads and would have been left far behind, as the commerce of the Erie canal has been left.

"The one connecting waterway of the great lakes system which has not kept pace with the march of improvements is the Erie canal. Her commerce has suffered in consequence, and New York has suffered with it. The proposed enlargement and betterment of the Erie canal is to fit it to properly play its part as the watery highway, the link connecting the commerce of the lakes with the commerce of the ocean. This it, and it alone, can do.

"Leaving this general discussion and coming to something more definite I would say that New York should build the 1,000-ton barge canal from the great lakes to the Hudson, because:

"First. She would be taking advantage of a great business opportunity in doing so.

"Second. Because it would greatly benefit the state, and

"Third. Because she can afford to do it.

NEW YORK'S SUPREMACY DUE TO HER CANAL.

"First. New York owes her commercial supremacy, her position as the empire state, the richest and most populous state in the union, primarily to the facilities for transportation which she has produced and afforded by her canals and railroads, through the natural gateway between the Atlantic and the great lakes which lies within her borders, and which is a better gateway than is possessed by any other state or combination of states. Transportation is the great controlling factor in all commercial struggles, and transportation by water is the cheapest of all transportation and is particularly suited to the rough natural products of the fields, forests and mines, and heavy, coarse, cheap articles, regarding which quick delivery is not of prime importance. Railroads, on the other hand, are best suited to the transportation of passengers and manufactured articles and products and perishable goods requiring quick delivery. In an ideal system of transportation canals and railroads supplement each other and are not antagonistic. It is such a combination that for three-quarters of a century New York has had and on which she has built up her greatness, and which today exists on and about the great lakes. The railroads have been constantly improved and kept up to date, while the other great transportation element in the ideal system, the canals, have not been improved

and are left in a miserable, antiquated, inadequate and uncertain condition and cannot now play their proper part.

"Nature has given to New York, and to New York alone of all the states, the only practicable route for a canal from the great lakes to tidewater, and New York of all the states can therefore alone have the ideal system of transportation between the lakes and the sea. It was a business opportunity of which the state took advantage when she first built the Erie canal, and it is no less a business opportunity which now presents itself to her of improving the canals, enlarging and modernizing them so that they are abreast of other means of transportation and adapted to play their part in the ideal combined canal-railroad transportation system of the future.

"As it is the fortune and duty of most successful business men and manufacturers to occasionally stiffen up their courage and discard their old, worn-out and out-of-date plant and install new plants with all modern and up-to-date improvements, so occasionally it must be the duty of a great business organization like the state of New York to discard its old plant and install new; and that occasion in regard to the Erie canal has undoubtedly arrived. A wise and observing business man who had traveled much in England and America once stated that 'the reason American manufacturers kept so far ahead of their English brethren was that the Americans knew the value of a scrap heap while the English did not.' To keep abreast of successful American business men and corporations New York must relegate the present Erie canal to the scrap heap and build in its place the very best canal that the general route through the state is adapted to.

BENEFITS FROM A 1,000-TON BARGE CANAL.

"Second. New York should build the 1,000-ton barge canal because it will greatly benefit her. This benefit may be summarized in the one statement that it will cheapen transportation across the state from the great lakes to the sea and to all points within the state reached by it. All the myriad and far-reaching benefits which will result from the canal base themselves upon this fact. It has been very clearly established that with the canal proposed the actual cost of transportation will be about one-third the cost by the present Erie canal, but slightly more than the cost of transportation on the lakes and far less than the cost of transportation by rail. The relative cost of transportation by the present and proposed Erie canal has been carefully worked out by taking as a basis the known cost of the various items entering into the total cost by the present canal and applying them under similar conditions to the larger canal. These items include interest on cost of boats, allowance for deterioration, expenses of operation, care of boats, insurance on boats and cargo, and carrying capacity. These can then be compared with the known and readily computed cost of transportation under similar conditions on the lakes. It is vastly more difficult to determine the cost of railroad transportation, which differs on every road and from an almost infinite variety of causes. Investigation, however, compels the conclusion that the cost of railroad transportation is very much in excess of the cost of transportation on any ample waterway under fairly comparable conditions.

"Coarse freight is carried on the lakes at rates which the railroads are wholly unable to reach, although the water route is very much longer than the land rail route, in some instances double. Across New York the canal and rail routes would be about equally long, and the canal rates per ton-mile would differ but little from those on the lakes. It must therefore be admitted that with the enlarged canal as projected the business of transportation can be done profitably at a much lower rate than at present by canal or rail. This is a conclusion that cannot be successfully questioned. This will benefit New York in a great variety of ways, a few only of which I will enumerate.

"(a) It will prevent railroad discrimination against the port of New York. There is now and has been for years serious discrimination in railroad rates against New York. The theory on which this is based is that the export products of the west and northwest shall reach Europe through all our Atlantic ports at practically the same cost for the through freight. Now New York city, due to the magnitude of her commerce and the fact that nearly all her exports are sent as berth cargoes on vessels that run anyway, commands lower ocean freight rates than any other port. To make up for these lower ocean freight rates the railroads entering New York are compelled by railroad combinations to charge higher rates than other ports so that the through rates shall be equal. The city is thus handicapped and is prevented from reaping the advantages rightly due her from the lower ocean freight rates that she possesses. With the barge canal built this discrimination must cease, for then it would be the canal and not other railroads and combinations of railroads that would fix and determine rates to New York city, and she would be able to take full advantage of her unrivalled position in the world of ocean commerce.

"(b) There are vast areas of land in the west and northwest that might be called debatable lands. Their products can go to almost any of our Atlantic or gulf ports at nearly the same cost for transportation. The smallest fraction in favor of one port over another will send the products of a great area booming to it. All ports are straining every nerve to get and keep all the trade of this great debatable land that they can. New York must do likewise, and the more she can lower the rates of freight from this vast territory to her doors the more of it she can hold in her commercial grasp.

"With the canal built as projected freight rates will be attainable which must render enormous areas of this land tributary to New York. Now commerce consists in selling as well as in buying, and as the farmer buys his tea, tools and clothes where he sells his butter, eggs and wheat, so these great debatable western areas will buy their needed supplies of manufactured articles and goods where they sell their products. It is therefore New York's double duty to bring to her doors the products of every part of this western country possible, and in return to furnish it with its needed supplies. And this she can do only by furnishing cheaper transportation than her rivals. The proposed canal offers the means for furnishing this cheaper transportation.

EXTRAORDINARY DEVELOPMENTS AT NIAGARA FALLS.

"(c) There is this highly interesting situation in New York state: At its eastern extremity is situated the greatest city of the hemisphere, and which is probably destined to become the greatest financial and commercial city in the world. At its western extremity there is at Niagara Falls the greatest present and prospective electrical power development in the world. Already the works completed and in progress involve an expenditure of fully \$25,000,000, and the factories built to utilize the power have cost many millions more, and the whole thing is but in its infancy, only about five or six years old. At this point and along the Niagara frontier, and due to the power of the falls, will surely be built up the greatest manufacturing center in the world. In order that the state should have the privilege of furnishing raw materials and products to this great manufacturing center and enjoy its products at the lowest cost, and that these manufactories should thrive to the greatest degree possible, it is most desirable and essential that the financial and commercial center at the seaboard should be connected with the manufacturing center by the proposed canal, in order that the cheapest possible transportation may be provided between the two and to all points on and near its route.

"(d) One of the greatest, if not the greatest, industrial development of modern times is in the iron and steel business. In all this New York has had very little share. Strong efforts are being made to obtain for the state a proper share of this business. On the shores of Lake Erie, near Buffalo, a magnificent steel plant, one of the finest in the world, involving an expenditure of \$40,000,000, is being built, and at another point ground has been broken for a very large system of blast furnaces. In order that the iron and steel industry in the state shall furnish to the highest degree possible, and as well in order that the whole state may reap the greatest benefits from this state industry it is essential that the cheapest attainable transportation facilities be provided across the state from Lake Erie to tidewater for ores and the finished iron and steel products, and this means the best possible canal suited to the general Erie canal route.

"(e) With the barge canal built every place along its course would have nearly all the advantages of a lake port and a sea port, where raw materials could be assembled at the lowest cost and manufacturing carried on to the greatest advantage. The canal would increase the products of the west coming to and through the state and increase the demands for her goods and manufactured articles, and there would in consequence be created increased and better home markets for the agricultural products of the state, and farmers would raise high-priced and remunerative crops instead of low-priced and unremunerative crops. The net result would redound enormously to the benefit of the agricultural population of the state and farm values would increase proportionately.

"This enumerating of benefits to come from the canal might continue indefinitely. It is, however, impossible to state the value of the benefits in figures to offset the cost of the canal. It is a matter far too complicated and too broad in its scope to be stated, and the profits all worked out with the exactitude of an ordinary business prospectus. It may be stated broadly that in every way it will be of benefit to the state and in no way will it be a detriment.

"Third. New York should build the proposed 1,000-ton barge canal because she is abundantly able to do so. New York is an enormously rich state, and she can build the canal without the slightest financial strain, in fact almost without feeling it. So rich is she that in all probability no direct taxes for state purposes will ever again be levied, and her revenues will be sufficient for all ordinary purposes and as well sufficient to carry on all needed works of public improvement, of which the canal improvement easily stands first in importance. It was a financial strain on New York to build the Erie canal over three-fourths of a century ago. When we compare her condition then and now, and consider her wealth, population, credit and business interests, the present proposed expenditure compared with the former is

relatively a bagatelle.

"To summarize again the reasons why New York should build the 1,000-ton barge canal she should do it because

- "(1) Nature has given her the location and opportunity;
- "(2) Because it will greatly benefit her; and
- "(3) Because she is able to do it."

GOVERNMENT REPORT ON MESABI RANGE.

Mr. O. K. Leith of the United States geological survey has submitted a special report on the Mesabi iron bearing district of Minnesota which now ranks first in point of ore production of any like area in the United States. After discussing at length the nature and character of the range Mr. Leith says:

"The Mesabi iron district lies in that part of Minnesota which is northwest of Lake Superior. It extends from Grand Rapids on the Mississippi river northeastwardly to Birch lake, about 85 miles, with a width varying from 2 to 10 miles. Its area is about 400 square miles. The main topographic feature of the district is a ridge known as the Mesabi, or Giant's range, Mesabi being the Chippewa Indian name for giant. The Mesabi range, for the most part, forms a divide whose drainage is apportioned among three of the great river systems of the country—the Mississippi, the St. Lawrence and the Nelson. Three railways, all with terminals on Lake Superior touch the range—the Duluth & Iron Range, the Duluth, Mesabi & Northern and the Great Northern. The development of the district has been marvelous. In November, 1890, iron ore was found just north of what is now known as the Mountain Iron mine; in 1892, 4,245 long tons of iron ore were shipped; in 1901, 9,004,890 tons were shipped, and the total shipments of ore during the ten years have been 40,404,967 long tons.

"The iron ore deposits of the Mesabi district are confined to the part of the Biwabik iron-bearing formation lying in the central and western portions of the district, and of the area of the iron formation in this portion of the district they occupy about 4 per cent. They lie near the surface and seldom reach a depth greater than 300 ft. Commonly the depth is less than 150 ft. They lie in shallow, irregular basins. The widths of the deposits seldom exceed a quarter of a mile, and the lengths are not uncommonly half a mile or more. The ores are, for the most part, slightly hydrated hematites. Only two deposits on the range are known to contain sulphur in injurious amounts. The Mesabi ores range in texture from large crystalline masses requiring the use of a crusher, as at Biwabik, to fine, soft dirt, which runs like sand between the fingers.

"The looseness of the ore as it lies in the deposit is shown by the fact that in computing the tonnage of Mesabi ores from 11½ to 18 cu. ft. are allowed per long ton, whereas in the hard ore deposits of other ranges the common figures are 8 to 9 cu. ft. per long ton. Because of the bedded and jointed structure of the ore deposits water is able to pass through them freely. The ore deposits are at present in part above water level and in part below it. A good instance of this appears at Virginia, where the Columbia mine on low ground receives a vast quantity of water, while the mines on the higher ground adjacent are comparatively dry.

"Because of the soft character of the Mesabi ores and of their occurrence in shallow deposits much ore is loaded directly by steam shovels on railway cars in open cuts. The Mesabi iron ores are transported to Lake Superior by rail, and thence by the lakes to terminal lake ports. In 1891 the district had not been opened up. In 1895 the Mesabi district became the largest producer in the Lake Superior region, passing in that year the Marquette district, which since 1854 had held first place. In 1901 the total production of the Mesabi district was 44 per cent. of that of the Lake Superior region, and two and one-half times as much as its nearest competitor, the Menominee, which, in 1901, for the first time surpassed the Marquette district in production. Largely on account of the Mesabi production the state of Minnesota in 1901 passed the state of Michigan as the largest iron producer in the United States. In total shipments the Mesabi district is still behind the Marquette district. At the close of 1901 the Mesabi district had shipped a total of 40,404,967 long tons, and the Marquette district, open since 1854, had shipped 62,847,473 tons. At the present rate of production the Mesabi total will pass that of the Marquette district in about four years. The total amount of high-grade ore—that is, containing above perhaps 58 or 59 per cent of metallic iron—at present in sight on the Mesabi range has been estimated at 400,000,000 to 600,000,000 tons. The commonly accepted figure is 500,000,000 tons. Of this 20 or 25 per cent. is Bessemer ore. The aggregate amount of high-grade ore in sight up to 1902 on all the 'old ranges' of the Lake Superior region has been thought not greatly to exceed 250,000,000 tons. Even if the estimates of the Mesabi range and the old ranges are considerably away from the truth, it is apparent that the Mesabi holds a commanding position in the region in its reserve tonnage. In 1901 the United States Steel Corporation sold about 72 per cent. of the total Mesabi production. It would appear that the Eastern Railway of Minnesota (Great Northern) stands well up among the leading iron ore interests, and if the iron ore deposits not yet opened for mining were taken into account the Eastern would probably stand second only to the United States Steel Corporation."

AROUND THE GREAT LAKES.

The United States marshal at Toledo, will, on Saturday, sell at auction the barge D. R. Martin to satisfy libelants.

The steamer Hattie B. Perue, which went ashore at the entrance to Holland harbor last week, has been abandoned as a total loss.

Notice of an advance of 25 cents a day in sailors' wages, the advance to take effect on Nov. 1, has been sent out by the Seamen's Union. The new card makes a schedule of \$2.50 on schooners, and \$2 on steam barges.

The revenue cutter Fessenden reports an uncharted shoal 3 miles south by east, three-quarters east, from Au Sable pier-head light, $1\frac{3}{4}$ miles from shore. The shoal has a minimum depth of 14 ft. and is directly in the path taken by vessels during westerly storms.

Capt. William Dulac, a well known vessel man at Mt. Clemens, died this week. He began sailing when he was thirteen years old. He was born Dec. 27, 1837, and had practically lived at Mt. Clemens all his life. He was interested in various enterprises in addition to shipping.

It is reported at Sault Ste. Marie that Mr. Francis H. Clergue has announced that plans have been made for supplying Detroit with electricity from the power plant at the Sault. It is the intention to carry the current by cable on towers. It is proposed to furnish 20,000 H. P. at first.

The action of officials of the Marine Engineers' Beneficial Association in offering rewards for recovery of the bodies of the two engineers lost with the steamer C. B. Lockwood, on Lake Erie, is commendable. It is certainly fitting that an organization of this kind should show such regard for its members.

The missing yawlboat with which ten men put out from the sinking steamer C. B. Lockwood was discovered bottom-side up last week by Capt. English of the steamer Grammar. The yawl was found floating not far from the scene of the wreck and as one of the oars was still strapped to the boat it is quite likely that it capsized shortly after it was launched.

The Anchor Line package freighter Muncy, which was launched at Detroit recently, has departed on her maiden trip. Capt. Dall Ryder, formerly master of the Susquehanna, has charge of her. It was not thought advisable to put package freight in the Muncy on her first trip and so she will take a cargo of iron ore.

The steamer City of Paris arrived at Duluth early last week with a cargo of hard coal, the second since spring. Dock laborers for the Northwestern Fuel Co. to which the cargo was consigned, refused to unload the vessel unless they were given the privilege of buying one ton of coal each which inestimable boon was generously granted to them.

According to its annual report the Duluth, Mesabi & Northern railway, one of the properties turned over by Mr. Rockefeller to the United States Steel Corporation, is in an exceedingly prosperous condition. Gross earnings from operation last year were \$3,755,416 and operating expenses were only \$1,576,525. The net income amounted to \$1,489,283. The surplus on June 30, 1902, was \$3,581,591.

About Thursday of this week all the range targets, floats and other aids to navigation, marking the channel in Amherstburg reach, Detroit river, will be moved about 250 ft. westwardly, so as to change the sailing route to the westerly or Bois Blanc island side of the channel while dredging is in progress on the easterly side, where at present the depth of water is less than on the westerly side.

Pickands, Mather & Co. have closed on an option for the Elizabeth mine at Hibbing, Minn., paying a bonus of \$325,000 for a state lease of the property held by the Elizabeth Iron Co. The company had proved up 11,700,000 tons of ore. The ore body is very deep, running 250 ft. in places. The mine will be an underground proposition and when it is opened it is expected that it will drain the Penobscot. It is said that it will be one of the wettest mines on the range.

At a special meeting of the board of directors of the Detroit & Cleveland Navigation Co., held in Detroit a few days ago, Hugh McMillan and General Passenger Agent A. A. Schantz were elected members of the board thus filling the vacancies caused by the death of Senator James McMillan. Senator McMillan's son, James H. McMillan, was elected treasurer and B. C. Wilder, who has been cashier of the company for several years, was elected assistant treasurer.

Two new shoals have been discovered by the United States lake survey near Waugoshance point, straits of Mackinaw. The larger one is composed of cobblestones and boulders with a minimum depth of $17\frac{1}{2}$ ft. at the present stage of water in Lake Michigan. It lies 13,580 ft. north, 52 degrees east from Waugoshance light and is about one-half mile south of the course through the straits recommended on the chart for large vessels. The shoal is about a mile long. The other shoal lies 4,050 ft. north, 65 degrees west from the Waugoshance black can buoy and 11,700 ft. north, 43 degrees west from Waugoshance light,

the least depth being 18 ft. at the present stage. This shoal has an area of about 500 ft.

Col. William P. Anderson, Chief engineer of the Canadian marine and fisheries department, and Capt. Lansing H. Beach, engineer of the eleventh light house district, made a tour up the St. Clair river last week as far as Point Edward to see about the restoration of lights on the Canadian side. At Point Edward Col. Anderson marked out on the ground provisionally the line of the axis of the cut leading from Lake Huron to the head of the St. Clair river. He expressed himself as not only willing but desirous of doing everything that was within his power in the matter of additional aids to navigation, and showed a readiness to co-operate with the lighthouse officials of the United States that was extremely gratifying to Capt. Beach. Just what he will do at Stag island or Point Edward is not known, as he made no definite statement. The vessel interests are anxious to have restored the range lights at Point Edward which they maintained at private expense some time ago.

In an interview at Duluth Mr. C. W. Turner, the general superintendent for A. Booth & Co. spoke as follows of the company's plans for its Lake Superior service next year. "It is just possible that we shall make a trade whereby the steamer Argo will go out of our line and be replaced by a much speedier boat with greater cabin capacity. The boat we have in view is a popular one, and we shall know in a few days whether the deal goes through or not. We have in view a plan for circling the shore of Lake Superior with a freight and passenger boat line by extending the route from Houghton to Sault Ste. Marie, and from the latter place to Port Arthur on the north shore. The distance is about 1,000 miles and the trip could easily be made in about a week. It is proposed to have four boats in the line. One will run from Duluth and Houghton, another between Houghton and Sault Ste. Marie, another between the Sault and Port Arthur. The circuit of the lake by this arrangement could be made from right to left or left to right as one might choose. It would be arranged, of course, to have close connections between boats and through tickets issued. We are now having a new boat built for us on the lower lakes to come to Lake Superior. She is 145 ft. long and 26-ft. beam. She will be equipped with fore-and-aft engines and Scotch boilers, and they have a speed of 16 miles an hour regular schedule. She will probably be used as one of the connecting links of the round lake service."

GUNBOAT MICHIGAN TO DO SURVEY WORK.

A short time since Capt. George P. McKay, chairman of the committee on aids to navigation of the Lake Carriers' Association, addressed a letter to the Secretary of the navy calling his attention to various uncharted obstructions and suggesting that the gunboat Michigan, which hitherto has done excellent survey work, be detailed to locate them. The letter follows:

"I have the honor to request in behalf of the Lake Carriers' Association, that the U. S. S. Michigan be detailed to find certain obstructions which have been a menace to navigation for a long time past and which should be definitely located as early as possible. The engineers in charge of the various districts of the great lakes claim that they have not the proper facilities for making survey work of this character; and it sometimes happens that when a vessel is sunk they claim to be without jurisdiction until it is either abandoned by the owner or underwriter. Meanwhile, of course, it is a menace to navigation. The obstructions which it is desirable to locate are the following:

"A boulder in the Rock island passage out of Green Bay, about $4\frac{1}{2}$ miles from Rock island lighthouse and a little to the southward of the east three-quarter north mark on the chart. This boulder is uncharted and has never been definitely located, though it has been struck repeatedly. All attempts to find it, however have failed.

"A sunken obstruction in the course from Buffalo to Cleveland, at a point about 3 miles west of Ashtabula. This obstruction has been run into several times during the present season, but attempts to find it lately and mark it with a buoy have failed.

"The sunken steamer W. H. Stevens in the direct course from Point Au Pelee passage to Long point.

"The steamer H. A. Barr, 35 miles east of Rondeau, in the direct course from Point Au Pelee passage to Long point.

"These obstructions have been a source of great annoyance to navigators during the present season. As stated, efforts have been made to locate them, but the facilities for doing so have not been adequate. The U. S. S. Michigan has already performed survey work in a most excellent manner, and the Lake Carriers' Association begs, therefore, to request that she be assigned to find these obstructions and chart them early next spring. Should you decide to assign the Michigan to this duty, the Lake Carriers' Association will, of course, furnish all the information which it has, in great detail, as to the approximate location of all these obstructions."

Capt. McKay has now received a letter from the captain of the Michigan asking for detailed information of the approximate location of these obstructions. It is likely, therefore, that the Michigan will undertake this work in the spring.

EARNINGS OF GERMAN SHIP YARDS.

The industrial depression which has prevailed throughout Germany during the past two years has not apparently affected the prosperity of the principal ship building companies in that country, if a conclusion may be drawn from the financial returns of these undertakings for the year 1901 or 1901-1902, as the case may be. It is reasonable to assume that the flourishing condition of the works in general is partly due to the careful attention paid to the development of the industry, and the avoidance of speculative ventures, and partly to the possession of orders which were received prior to the reaction in trade and the depression in the shipping branch throughout the world. At the same time it is only fair to mention that at the termination of the financial year most of the companies still had on hand extensive contracts, which are expected to keep them tolerably well employed until early in 1903, irrespective of orders which may be received during the present year. Thus it will be understood that, unless exceptional circumstances arise, the current financial period should be equally as satisfactory, as is indicated by the results to which reference will now be made in regard to the commercial position for 1901 or 1901-1902.

The Stettin Vulcan Machine Construction Co. of Stettin, first claims attention, inasmuch as its share capital, which amounts to £500,000, is greater than that of any other combined ship building and locomotive works in Germany. During 1901 the net profits earned by the company amounted to £95,743, as compared with £90,687 in the preceding year, and the dividend paid is at the rate of 14 per cent., as in 1900. The report of the directors, after referring to the abstention of the shipping companies from placing orders on a large scale, points out that, in view of this circumstance, it is all the more gratifying to find that the Admiralty has been able to proceed with the extension of the navy, and thereby ensure employment for the ship building yards and the iron and steel industry. The maximum number of workmen employed during the year was 7,119 and the lowest was 5,629. The development of German shipping and the navy has induced the directors to consider the advisability of establishing branch works on the North sea coast, either on the banks of the Elbe or the Weser, for the sole construction of large vessels at the commencement. A decision on the question has, however, not yet been arrived at, but the shareholders are to be consulted before any steps are taken to give effect to the proposal. The Blohm & Voss Co. of Hamburg, which has a share capital of £300,000, in addition to a bond issue of £115,000, comes second on the list. After making ample provision for depreciation, bringing the reserve fund up to the legal maximum limit of £30,000 and expending no less than £11,948 for sick, accident, and old age insurance funds—that is to say, a sum representing 4 per cent. of the share capital—the net profits for 1901-1902 amount to £27,084, as compared with £25,095 in the previous year. The profits, together with the balance brought forward, allow of the payment of a dividend at the rate of 9 per cent., this being 2 per cent. more than a year ago. On an average 5,350 officials and workmen were employed during the year, the average in 1900-1901 having been 4,420. The company has in course of construction six steamers and one sailing vessel, of a total of 29,904 gross register tons, and the large cruiser Friedrich Carl for the navy.

The third undertaking from the point of view of share capital is the Bremen Vulcan Ship Building & Machine Works Co. of Vegesack, which earned a net profit of £26,839 in the past financial year, as compared with £23,246 in the preceding twelve months. Out of the former a dividend of 12 per cent. has been paid on a share capital of £200,000, this being the same rate of distribution as in each of the three preceding years. The company had in course of construction at the beginning of the current financial year six large passenger and freight steamers and three sailing vessels, of 36,000 registered tons, thus ensuring full activity for the twelve months. The number of workmen employed advanced from 1,650 in 1900 to 2,600 last year.

It will be remembered that the company is financially interested in the Belgian Vulcan Co. of Antwerp, but as the latter will only begin operations on a large scale this year it has, of course, not yet contributed towards the income of the German company. The capital of the Bremen Vulcan company has now been increased to £300,000, in order to provide for the extension of the ship building yard at Lobbendorf and the formation of a connection with the Farge-Vegesack railway. As far as the financial results are concerned, the most satisfactory position is occupied by the J. C. Tecklenborg Ship Building & Machine Works Co. of Bremerhaven. The company now has a share capital of £100,000, and after meeting expenses and writing off £17,740 for depreciation, the net profits for 1901 amount to £37,600, as against £17,520 in 1900. Out of the profits the sum of £5,000 has been transferred to the reserve fund, and a dividend at the handsome rate of 20 per cent. paid on the share capital, as compared with 12 per cent. in 1900. During the year the company delivered three steamers and one sailing vessel, and four triple and two quadruple-expansion engines, whilst at the end of the year seven ships, of 32,310 gross register tons, were in course of construction, together with engines and boilers.

The Neptune Ship Building & Machine Works Co., Rostock, which distributed 9 per cent. in 1900, has been able to maintain this rate for last year on a capital of £82,500. During the year the shops were fully employed, and the number of workmen, amounting to 1,598, was slightly in excess of that obtaining in 1900. The output comprised eight vessels of 29,450 tons, as against nine ships of 21,300 tons in the previous year. The orders still

on hand will provide employment until the spring of 1903, and it is expected that the impending opening of the new harbor entrance at Warnemunde will benefit the company, by enabling large vessels built at Rostock to be more easily taken out to sea, and at the same time afford greater opportunities for bringing in ships for repair. With this object in view, a site has been acquired for the establishment of a large floating dock, which is to be completed early next summer. The sixth undertaking is that of the G. Seebeck Ship Building Machine Works & Dry Dock Co., of Bremerhaven, which has a share capital of £60,000, and upon which a dividend of 10 per cent. is proposed to be paid for 1901-1902, as compared with 10 per cent. in the preceding year, and 8 per cent. two years ago. A fresh issue of shares, to the extent of £50,000, is now being made for the purpose of providing additional working capital and extending the dry dock, which will shortly enable the company to build vessels of a total length of 550 ft. and a beam of 61 ft. The last enterprise to be mentioned is that of the Germania company, of Tegel, near Berlin. The undertaking of this company, which incurred a loss last year, has now been entirely taken over by Herr F. Krupp, who had for several years guaranteed the payment of a dividend of 4½ per cent. and who is carrying on the business in his own name.

It will be seen from the foregoing particulars that two of the ship building companies have been able to pay increased dividends for 1901, and four have yielded equal results to those of the previous year, whilst only one has proved to be less satisfactory. The position for a year of general depression is remarkable, and from all appearances the present year also promises to be a good period for the companies in question.—The Engineer, London.

URGING PASSAGE OF A SHIPPING BILL.

As a result of the convention of the advisory board of the Philadelphia commercial museums last week a movement is to be made to urge upon the next congress the importance of passing a shipping bill. The committee appointed by the convention to manage the agitation for reviving the American merchant marine to meet the increasing export trade needs of the United States has just made its report. Part of it is as follows:

"In the efforts now making to extend foreign trade it is manifest that the maritime nations of Europe maintain the lead largely, owing to the established lines of steamships under their own flag to the various ports of the world, while in our own country no progress has been made; the percentage of the American ocean carrying trade still continuing to be below ten, including American vessels engaged in the transatlantic trade. This condition, so disastrous to American interests, shows no sign of improvement, as other nations can build, man and equip their vessel at a cost estimated by high authority at not more than two-thirds the amount required here, and no remedy seems available except through congressional action. Your committee, therefore, offer the following:

"Resolved, That the officers of the Philadelphia Commercial Museum be requested to memorialize congress at the approaching session, praying for the adoption of such legislation as will tend to restore the American merchant marine; said memorial to bear the signature of the officers of the organization, including the members of the board of trustees, and that they be further requested to adopt any measure which may tend to facilitate favorable action of congress."

This report is signed by the full committee, which consists of E. G. Preston, Boston; Andrew Wheeler and William R. Tucker, Philadelphia; William M. Bunker, San Francisco; N. H. Sewall, Birmingham, Ala.; R. M. Coffin, Indianapolis, and Charles M. Biddle, Philadelphia.

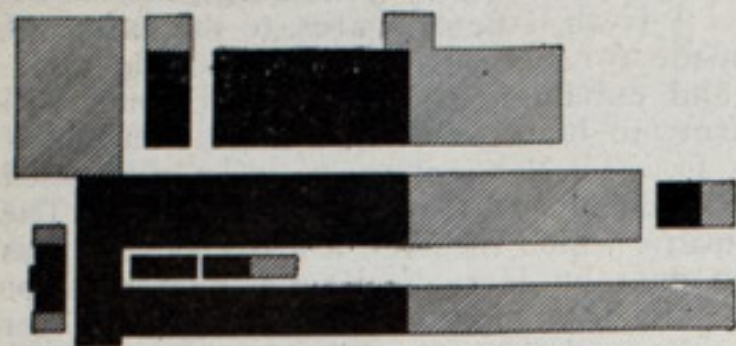
DEATH OF REAR ADMIRAL SELFRIDGE.

Rear Admiral Thomas Oliver Selfridge of the United States navy died last week. He had reached the advanced age of ninety-eight years. He was appointed to the navy from Massachusetts on Jan. 1, 1818, when he was fourteen years old. He was born in Boston on April 24, 1804. His first service as a midshipman was in the famous frigate Constitution which had destroyed the British frigate Guerriere in 1812. He became a lieutenant in 1827 and saw service in the west Indies, Brazil and the Mediterranean. In 1844 he was commissioned commander and in 1846 he was assigned to the Columbus, the flagship of the East Indian squadron. In the Mexican war he was in command of the sloop Dale, of the Pacific Squadron, and took part in the engagements at and capture of Matanzas and Guaymas. In the latter he received a severe wound which unfitted him for sea service. He then had command of the Boston navy yard for a time. His commission as captain bore the date of Sept. 14, 1855. In 1861 he was in command of the steam frigate Mississippi of the Gulf squadron. His wound prevented active sea service in the civil war and he was appointed commandant of the Mare island navy yard. He was made a commodore in 1862. On July 25, 1866, after forty-eight years of active service he was placed on the retired list by reason of the age limit. He was made a rear admiral in July, 1870.

Capt. C. S. Riche, United States engineer at Galveston, advertises elsewhere in this issue for bids on over \$1,000,000 worth of dredging and nearly \$1,000,000 worth of jetty work.

NEW WORKS OF THE B. F. STURTEVANT CO.

The new works of the B. F. Sturtevant Co., now nearing completion at Hyde Park, Mass., present an excellent opportunity to study the factor that control in the location and design of the modern Manufacturing plant. The present plant at Jamaica Plain, Mass., is limited in its opportunity for growth, its capacity has long been strained to the utmost, and, as a consequence, the question of removal has continued to present itself with ever-increasing force. The fire which occurred last year forced an immediate solution, and a new site was selected after the most careful consideration. Aside from the



Possible additions are shown by shaded areas.
New Plant of the B. F. Sturtevant Co., Hyde Park, Mass.

general character of the lot itself the principal factors considered in reaching a decision were proximity to raw materials and to an abundance of skilled labor, adequate shipping facilities, ample water supply, and space for ready disposal of waste material. The advantages of the west as against the east were carefully weighed, but the company readily expressed its abiding faith in the prosperity of New England, in the facilities which it presents for work of the character conducted by this company, and in the quality of its skilled labor as an offset to present somewhat higher rates for raw materials. The best combination of advantages was presented by a lot of nearly twenty acres of land in the town of Hyde Park, Mass., already well known as the home of such industries as the Becker-Brainard Milling Machine Co., the American Tool & Machine Co., the new shops of the New York, New Haven & Hartford railway, etc. Here was presented a population of particularly skilled workmen which could readily be supplemented by present employees of the company, the new location being only 5 miles from the old plant. The lot selected has a frontage of about 1,800 ft. upon the freight yard of the New York, New Haven & Hartford railway at Readville station, the distributing point for all freight passing over either the Midland or Providence divisions of that road. One side of the lot is bounded by a plentiful stream known as Mother Brook and the adjacent shore is at a level of nearly 10 ft. below that of the yard and buildings, thus providing sufficient space for dumping waste material for years to come.

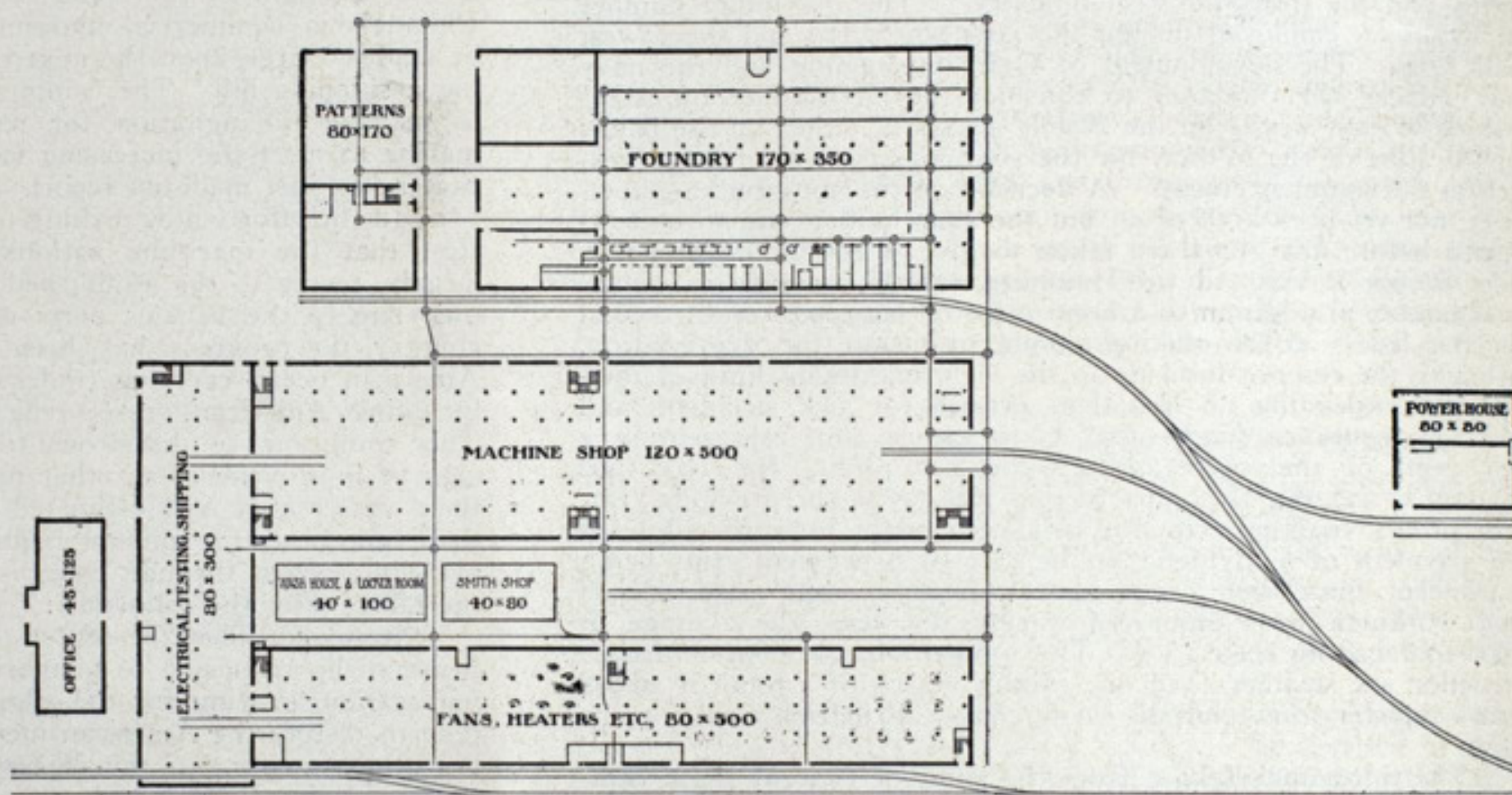
The site having been selected, most careful consideration was given to the size and character of the buildings; the head of each department was consulted, his recommendations reduced to writing, and frequent conferences held as to the requirements of the individual departments. With these data at hand the individual and aggregate areas were determined and the plans started with the idea of providing a total floor space slightly more than double that of the present plant. Consideration was first given to the question of the number of floors to be provided in the various buildings. The lay of the land and its availing area being somewhat against a group of one story buildings, and a simple calculation showing that the actual cost of the power expended in a single year for lifting the entire product of the works through a distance of 20 ft. figured only a little over a dollar, determined the company upon the building of multi-storied buildings. The character of the products of this company readily lent itself to such a design, and it was believed that the fixed charges on elevating machinery would be more than offset by a reduction in the horizontal distance necessary to be traversed.

The arrangement of the buildings was determined by the provision to be made for growth. One arrangement of a series of parallel buildings permitted increase only by multiplication of buildings, but provided an excellent opportunity for the carrying of switch tracks across both ends of each building. The other arrangement provided for a group of buildings parallel to the railroad tracks with accommodation for switch tracks between the buildings, and for their entrance at the ends of the building with an opportunity for growth by extension in length. After a careful working out of many schemes and a comparison of the advantages and disadvantages the latter arrangement was

adopted. The small plan which is presented herewith shows by the shaded portions the opportunity for increase of size in each of the buildings.

The construction of the buildings next received consideration. The latest development of all-steel and concrete construction with large window areas did not appear to meet the requirements of a group of buildings as permanent and substantial in their character as these. All-steel buildings with brick walls and concrete fire proof doors presented disadvantages in the way of discomfort to the workmen, inconvenience in attaching machines on hangers, and excessive expense which did not appear to be offset by advantages to be secured in the way of absolutely fire proof construction. The type finally selected is composite in its character consisting of steel interior columns and main steel girders, with heavy brick walls, wood timbered floors and plank roofs. In the case of the one story foundry, the roof is supported by steel trusses, in the other buildings open timbering with wooden columns in the upper floor is employed. The main floor in the machine shop is of tar concrete with spruce and maple flooring. The upper floors are carried upon wooden beams spanning the spaces between the steel girders, which follow a unite system of 20 ft. on centers through the building. All roofs are of 5-in. plank with tar and gravel top.

The question of power was early decided to the extent that the entire plant would be electrically driven from a center power house; that the engines would run condensing, that the exhaust steam derived from engines under test, which is considerable, would be utilized for heating with supplementary amount of live steam admitted at reduced pressure as might be required. The final decision regarding the power house placed it sufficiently far from the ends of the buildings to permit sufficient

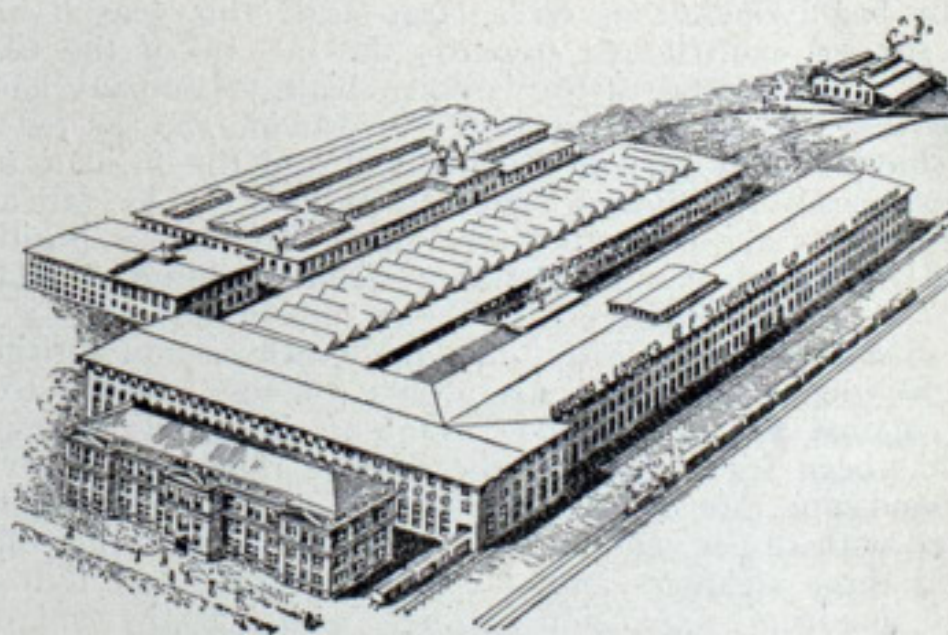


New Plant of the B. F. Sturtevant Co., Hyde Park, Mass.

extension of each and near enough to the water supply to reduce to a minimum the expense of conveying condensing and other water.

In one of the accompanying illustrations is presented a block plan of this plant showing that in its design the most careful consideration has been given to the transfer of materials through the various buildings to the point of storage or shipment.

The pattern building provides at one end a two-story portion 50 ft. square for carpenters and flask makers on the first floor,



New Plant of the B. F. Sturtevant Co., Hyde Park, Mass.

and for pattern makers upon the second floor. The balance of the building which is devoted to pattern storage is provided with intermediate floors making four in all separated from the other portion of the building by double fire walls and automatic fire closing doors. The close proximity of this building to the foundry facilitates rapid intercourse.

The foundry, 170x350 ft., is designed with the idea of distributing iron upon a track system, and is to be equipped with narrow-gauge railways, bedded in concrete, making runways between the moulding floors. Two craneways run lengthwise through the building the greater part of its length and the tracks extend beneath the crosswise traveling crane in the cleaning room at the end of the building. The brass foundry is located in one corner, a wash room in the adjacent corner, a core room between the two; the latter has ample opportunity for growth towards the center of the building, while the foundry itself can be extended to practically double its length. Storage for supplies is provided upon one side adjacent to the railroad switch. From the bins thus provided the iron and fuel charges will be carried directly to the charging floor.

From the foundry the castings will pass to the rear of either the machine shop or the fan shop. The former is of the familiar gallery type, 500 ft. long, with wings 40 ft. wide, and central runway of the same width for crane of 20-ton capacity. The lighting will be principally by a series of sawtoothed skylights running crosswise of the roof with glass facing due north. The crane will serve the entire floor and transport heavy castings from the machine tools to the erecting floor where the completed engine or generator may be lifted upon a transfer car passing through the testing building, and there picked up by another 20-ton crane which will drop it upon the testing plate and subsequently carry it forward to the steam railway track which passes through the end of the building and provides space for the loading of two cars at a time. The upper floor of this building, together with portions of the adjoining buildings, is devoted to the electrical department and provided with individual small traveling cranes.

The building devoted to the manufacture of fans, heaters, etc., is 80 ft. in width, of the same length as the machine shop, is three stories in height, of typical mill construction, provided with all conveniences for handling material, and arranged so that shipment can be made from numerous points along one side, while supplies are brought in from the court between it and the machine shop.

The smith shop, 40 ft. by 80 ft., serves both buildings with equal facility, while the wash house and locker room, measuring 40 ft. by 100 ft. and three stories in height, is so located as to reduce to a minimum the distance to be traversed by the individual workmen. The third floor will be used as a lunch room.

The standard first floor height in the main buildings is 17 ft., that of the second and third stories is 15 ft. The windows are large and numerous.

The office is to be a model structure of its kind, and is to serve as headquarters for the entire business. It will contain the correspondence, designing and draughting offices, the superintendent's quarters, and the cost department, the advertising bureau and a printing office, which will be located in the basement. It will be three stories in height with a finished attic to provide additional draughting room space.

The equipment of this plant will be largely "Sturtevant" in its character. Beginning with the power plant, the mechanical draft apparatus, the engines and generators and the exhaust head will be of Sturtevant make. The buildings will be heated by the Sturtevant system, the shafting and individual machines driven by motors of the same make, the refuse from the wood working machinery, the dust from the cleaning room of the foundry, the ventilation of the offices, toilet rooms and wash house, and the removal of smoke from the smith shop will be accomplished by Sturtevant exhaust fans, while Sturtevant blowers will be used for brass and iron foundry, forge shop blast and the like, and Sturtevant steam traps will be employed upon the steam dryers.

The accompanying bird's-eye view presents a clear idea of the general arrangement and appearance of these buildings.

BATTLESHIPS IN WAX.

The Pall Mall Gazette, London, publishes the following interesting item:

One of the most important and certainly the least known of our naval establishments is the testing house at Haslar. So jealously are the secrets of this place guarded that naval officers even are not allowed to enter it unless they first obtain an official permit. These permits are sparingly granted, for the British admiralty has a penchant for not letting its right hand, as represented by one branch of the service, know what its left hand, represented by other branches, is doing. In this case secrecy is not maintained without good reason, for the testing tank, to give the place its everyday name, is a sort of incubator where the ideas of naval architects are hatched out. When the chief constructor designs a new ship his proposals are laid before the admiralty, and, if approved, a rough draft is sent to the officials in charge of the testing tank. These make a complete model of the proposed new man-of-war, and carry out experiments which demonstrate to a nicety whether a ship of the submitted design will achieve what is expected of it.

The model is made to scale and of paraffin wax, the only substance suitable for the purpose. It is then placed in a long tank filled with water. To the bow of the model is affixed a length of string having a weight hung at the other end of it. This weight gradually draws the model along the tank. As it moves calculations are made, which give the speed of the vessel under various conditions and with different engine powers. Stability

is also ascertained, for two guides run on either side of the model the full length of the tank. Careful watch is kept to see whether the model heels to one side or the other, and not until it has floated the full distance without touching the guides is the stability correct. Should the model lean to one side or the other the top-heavy parts are carefully shaved off until perfect equilibrium is obtained. The shavings are then weighed in delicate balances, and calculations made which give to a pound the reductions in weight which have to be made in various parts of the ship to insure her the right degree of metacentric height. When this has been done the information obtained is sent up to the admiralty. The necessary modifications are made, and the complete plans of the ship got out. Once again the testing tank is called into operation. More wax models are made and tried, and not until the officials at Haslar report that all is as desired is the order to build the ship given.

The tanks were established as the outcome of a series of important experiments in the effect of wave-motion upon ships. These experiments were begun by the late Mr. Froude, a brother of James Anthony Froude, who made discoveries of such importance that the admiralty adopted his method of research, and set up the establishment at Haslar, placing Mr. Froude in charge of it.

GRAPHITE SIGHT-FEED LUBRICATOR.

The Lunkenheimer Co., Cincinnati, is directing attention just now to their graphite sight-feed lubricator, which is illustrated herewith, by exterior and sectional cuts. In a pamphlet descriptive of this device they say:

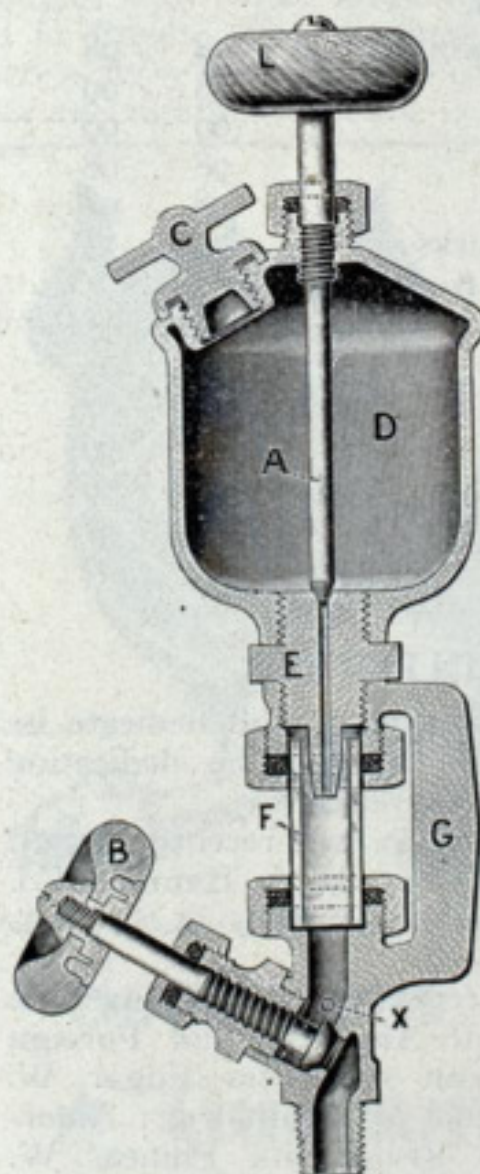
"The tendency of the present period among steam users generally is toward higher pressures and often super-heated steam, and the use of oil as a lubricant is not entirely satisfactory in all cases. Powdered graphite has long been known as a superior lubricant, having the peculiar quality of being adapted to be forced into the superficies of the cylinders and valves of steam pumps and engines, due to the motion of the moving parts, giving them a highly finished surface, thus reducing the friction and requiring very little oil.

"While graphite possesses high lubricating qualities, at the same time it is not advisable to use it alone. We therefore deem it a good practice to use in connection with the graphite lubricator either an oil pump or sight-feed lubricator, and when this combination is effected, it is only necessary to feed about one-third as much oil as when no graphite is used.

"Another valuable feature of graphite is that it fills up the crevices and interstices of the packings, thus the stuffing boxes need not be kept so tight and the friction on the rods and valve stems is lessened. It also increases considerably the durability of the packings. While many engineers would use graphite, they have found considerable difficulty in procuring suitable apparatus for feeding it to the parts to be lubricated.

We now present to our engineering friends our single connection graphite sight-feed lubricator, and can confidently guarantee it to be perfect in every particular, and suitable for the purpose its name implies. The graphite is fed automatically and continuously in desired quantities, and visibly by passing it through a sight-feed. The cup requires but one connection to the cylinder, is very simple in construction, compact and ornamental in appearance. This lubricator should always be placed on the steam chest. On slide valve engines it is only necessary to use one cup, placing it about the middle of the steam chest, but on Corliss Engines it is best to use two, placing one over each valve."

Directions for operating provide for closing the steam valve B and opening the drain plug X to allow steam to escape from cup; then close regulating valve A, remove filling plug C, and fill cup with graphite. After replacing filling plug close drain plug, open steam valve (wide) and regulate feed of graphite by regulating valve. The sight-feed glass can easily be cleaned by opening drain plug. If necessary to replace the sight-feed glass take cup apart by means of lock-nut E, and slide the new glass down through the opening. As graphite is a very superior lubricant, and a small quantity will last quite a while, it is recommended to be used very economically, as a continuous feeding of same is not necessary; thus the feed can occasionally be shut off.



SUMMARY OF NAVAL CONSTRUCTION.

Warships under construction in the various shipyards of the country are forging steadily ahead, though, owing to conditions affecting the general iron and steel trade, the progress is not rapid. All the torpedo boats and torpedo boat destroyers are practically complete. Following is the latest summary:

| Name. | Building at | Degree of completion. | |
|---------------------------------|------------------------|-----------------------|-----------|
| | | Per Cent. | Per Cent. |
| | | Sept. 1. | Oct. 1. |
| Battle ships. | | | |
| Maine..... | Cramp & Sons | 94 | 96 |
| Missouri..... | Newport News Co. | 71 | 74 |
| Ohio..... | Union Iron Works | 62 | 64 |
| Virginia..... | Newport News Co. | 5 | 7 |
| Nebraska..... | Moran Bros. Co. | 0 | 9 |
| Georgia..... | Bath Iron Works | 14 | 15 |
| New Jersey..... | Fore River S. & E. Co. | 13 | 15 |
| Rhode Island.... | Fore River S. & E. Co. | 13 | 15 |
| Armored Cruisers. | | | |
| Pennsylvania.... | Cramp & Sons | 31 | 32 |
| West Virginia... | Newport News Co. | 31 | 35 |
| California..... | Union Iron Works | 12 | 13 |
| Colorado..... | Cramp & Sons | 33 | 35 |
| Maryland..... | Newport News Co. | 29 | 33 |
| South Dakota... | Union Iron Works | 9 | 11 |
| Protected Cruisers. | | | |
| Denver..... | Neafie & Levy | 83 | 84 |
| Des Moines..... | Fore River S. & E. Co. | 74 | 75 |
| Chattanooga.... | Lewis Nixon | 62 | 63 |
| Galveston..... | Wm. R. Trigg Co. | 64 | 64 |
| Tacoma..... | Union Iron Works | 53 | 54 |
| Cleveland..... | Bath Iron Works | 86 | 88 |
| St. Louis..... | Neafie & Levy | 4 | 7 |
| Milwaukee..... | Union Iron Works | 5 | 6 |
| Charleston..... | Newport News Co. | 14 | 17 |
| Monitors. | | | |
| Arkansas..... | Newport News Co. | 99 | 99 |
| Nevada..... | Bath Iron Works | 95 | 98 |
| Florida..... | Lewis Nixon | 94 | 94 |
| Wyoming..... | Union Iron Works | 93 | 95 |
| Torpedo Boat Destroyers. | | | |
| Bainbridge..... | Neafie & Levy | 99 | 99 |
| Barry..... | Neafie & Levy | 99 | 99 |
| Chauncey..... | Neafie & Levy | 99 | 99 |
| Hopkins..... | Harlan & Hollingsworth | 94 | 95 |
| Hull..... | Harlan & Hollingsworth | 94 | 95 |
| Lawrence..... | Fore River S. & E. Co. | 99 | 99 |
| McDonough.... | Fore River S. & E. Co. | 98 | 98 |
| Stewart..... | Gas E. & P. Co. | 90 | 96 |
| Whipple..... | Maryland Steel Co. | 99 | 99 |
| Worden..... | Maryland Steel Co. | 98 | 99 |
| Torpedo Boats. | | | |
| Stringham..... | Harlan & Hollingsworth | 98 | 98 |
| Goldsborough... | Wolff & Zwicker | 98 | 99 |
| Blakely..... | Geo. Lawley & Son | 99 | 99 |
| Nicholson..... | Lewis Nixon | 98 | 98 |
| O'Brien..... | Lewis Nixon | 98 | 98 |
| Ingely..... | Columbian Iron Works | 74 | 75 |
| Submarine Torpedo Boats. | | | |
| Plunger..... | Lewis Nixon | 96 | 97 |
| Adder..... | Lewis Nixon | 99 | 99 |
| Grampus..... | Union Iron Works | 88 | 88 |
| Moccasin..... | Lewis Nixon | 99 | 99 |
| Pike..... | Union Iron Works | 80 | 80 |
| Porpoise..... | Lewis Nixon | 98 | 98 |
| Shark..... | Lewis Nixon | 98 | 98 |

ITEMS OF GENERAL INTEREST.

The Lunkenheimer Company of Cincinnati will dedicate its Fairmount works on Saturday of this week. The dedication will be made the occasion of elaborate exercises.

Mr. L. C. Hanna of M. A. Hanna & Co. was recently elected a director of the Republic Iron & Steel Co. M. A. Hanna & Co. have very close relations with the Republic company in the mining and transportation of iron ore.

Among vessels classed and rated recently by the American Bureau of Shipping in the Record of American and Foreign Shipping are the following: American schooners Edgar W. Murdock, Lydia M. Deering and Samuel W. Hathaway; American three-masted schooners William Bisbee and Phineas W. Sprague; American barkentine St. Paul; British schooner Empire.

The Baltimore Marine Railway, Machine & Boiler Works, Baltimore, Md., is constructing a steam yacht of the following dimensions: Length, 125 ft. over all; keel, 100 ft.; beam, 18 ft.; depth, 9 ft. 6 in. She will be equipped with a triple-expansion engine with cylinders 10, 15 and 15 in. in diameter, with stroke of 15 in. Steam will be supplied by two class D Almy water-tube boilers. She will have a Wheeler surface condenser. A complete electric light plant will be installed and all fixtures will be first-class.

Mr. Frank W. Gilchrist of Alpena, Mich., brother of J. C. Gilchrist of Cleveland, is now the owner of the steamer Mira, which James Reid, lake wrecker, released from the rocks near Yarmouth, N. S. He bought the vessel through Reid. Capt. Reid was to have had \$50,000 for his work. Instead of taking this sum in payment from the underwriters, he paid the underwriters \$50,000 and agreed also to relieve them of certain expenses, amounting to probably \$4,000 or \$5,000, which should have been paid by the underwriters and not by Reid as wrecking master. Reid has probably cleared up \$30,000 or \$35,000 in the transaction. The steamer has cost Mr. Gilchrist something more than \$100,000. With an expenditure of another \$100,000 in repairs and alterations he will have a good 6,000-ton steamer. It is understood that Mr. Gilchrist intends in rebuilding the Mira to fit her for the oil trade.

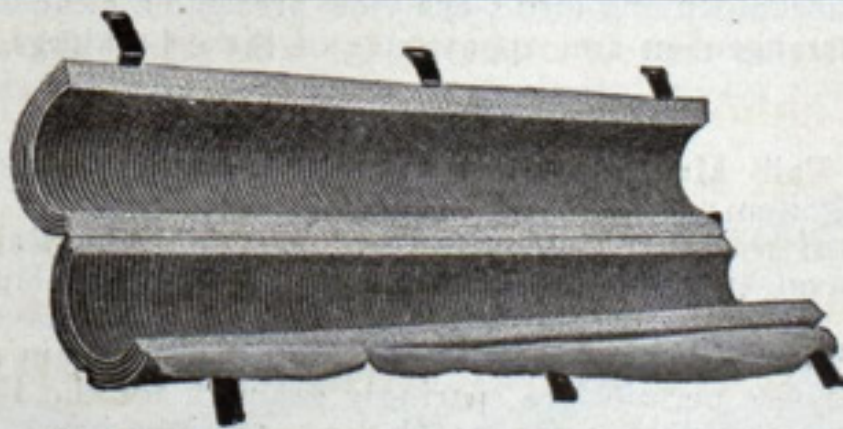
The Engineering Company of America, a new concern under management of old and well known heads in the engineering world, has opened offices at 74 Broadway, New York City, for the purpose of carrying on a general engineering business, the company being incorporated under the laws of the state of New York for such purposes. The officers of the company are: Frank Clemes Smith, E. M., president; August Roesler, vice-president; Joseph Hyde Pratt, Ph. D., secretary. The company has a large corps of consulting engineers who are in many cases noted specialists and experts in their respective lines, such as civil, mining, mechanical, electrical and chemical engineering, ship building, railroad engineering, forestry, building construction, physical tests, inspection of structures and materials, investigation of new problems in mechanical or structural work, determination of efficiency of machinery, erection of mills and smelters, operation of mines, etc. In fact the company's diversified corps of engineers enables it to cover the entire range of engineering in all its branches.

A very attractive announcement from the Chicago Nautical School, Masonic Temple, deals with the school courses, prices of tuition, etc., for the season about to open. The pamphlet may be had upon application to the principal, Lieut. W. J. Wilson, who has certainly made wonderful progress with the Chicago school in a very short period. The principal announcement this year is in relation to the course in marine engineering. The school is now ready to satisfy calls for instruction in this line. Mr. John G. Kreer, who will have charge of this feature during the coming school year, is a graduate of the Royal School of Naval Architecture, Berlin-Charlottenburg, Germany; served for some time in the experimental model basin of the North German Lloyd at Bremerhaven, and also taught the employees of that line in the engineering branches. He has prepared three courses in engineering, graduated to meet the capabilities of those who have had experience in engineering, as well as those who have still to acquire it; and these courses will range from the rudiments through the various branches and up to naval architecture and engine designing, if desired. It is, of course, fully understood that the regular work of teaching navigation will not be interfered with in the least because of this new branch.

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ST. JOHN IN THE FIGHT.

A dispatch from St. John, N. B., dealing with the proposed Canadian fast steamship service, says:

"People in this city are watching with keen interest the announcement of the Canadian Pacific Railway Co.'s plans for a steamship service, for there is a strong belief that the matter is of more vital interest to St. John than any other Canadian port. Apparently Halifax will be the terminus of the fast boats if the government agrees to pay the enormous subsidy asked to secure them, but the St. John board of trade is not going to let Halifax get this without putting up a fight. It is the freight service, however, that is counted on for this port. It is taken for granted that these boats, which will be put on whether or not the company gets the fast line contract, will run to St. John in winter, and there is a growing belief that they will come here in summer as well. St. John, as is well known, is the winter outlet of the Canadian Pacific, and while the company might prefer to send its summer cargoes to Montreal or Quebec, the increased cost of insurance in the St. Lawrence, will, it is thought, induce them to fix upon St. John as the summer and winter port of their freight line. This will, of course, mean much to St. John, for it will greatly increase the business through the port. To accommodate the new service important extensions to the harbor facilities will be necessary, and it is anticipated that the government at the coming session of parliament will ask authority to spend something to help along the work here. The improvements already provided, costing nearly \$1,000,000, were paid for by the city and give accommodation to five large ocean steamers. An extension of the works on the plans of the city engineer can easily be made giving eleven more berths. It is thought that the Canadian Pacific will build the necessary wharves and warehouses of the Dominion government will do the dredging, which is pretty extensive, and will necessitate an expenditure of probably well on to \$2,000,000. With these facilities provided St. John will have fifteen or sixteen good deep water berths for the shipment of through merchandise; an equipment that will enable the Canadian Pacific and other Canadian roads to handle all the business they can send here, and will permit them to keep pace with any development the west may make. Another Canadian Pacific steamship project about which little has been heard, but which it is thought likely to be launched, is a line from this port to Havana, there to connect with the railway interests controlled in Cuba by Sir William C. Van Horne. This, it is anticipated, will open up a valuable market to Canadian manufacturers and producers, and give an opportunity to bring to Canada the products of Cuba."

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DISPUTE ABOUT ARMORED CRUISERS.


Two of the most powerful armored cruisers yet designed for the United States navy are the subject of wide difference of opinion among members of the naval board of construction. The contention relates to the amount of horse power that should be provided to develop the required speed of 22 knots. Rear Admiral George W. Melville has taken the position that the vessels should not have the narrow margin of power to produce the required speed insisted upon by Chief Constructor Bowles. The members of the board have taken sides and the dispute promises to delay the soliciting of bids for these vessels.

The disagreement in the board is over the weights of machinery, the chief constructor urging that the horse power be reduced, while Admiral Melville stands out for heavy machinery and plenty of steam power. The designs call for ships of at least 22 knots' speed, and under the usual rule of the engineering department sufficient margin would be allowed to develop a speed of 23 knots, or even more. In allowing this margin Admiral Melville points out that there have been few warships built the speed of which did not exceed that required under contract, and in some instances by nearly two knots. This has given the American navy the speediest vessels for type, class and displacement afloat, and, therefore, the best, with equal protection and armor considered.

Admiral Bowles bases his contention upon trials made in the experimental tank at the navy yard in Washington with different models approximating the lines of the proposed ships, in which he says 22 knots may be secured with less power than Admiral Melville insists upon. The latter says that the models were tried without bilge keels, in smooth water, and no allowances made for heavy seas or head winds and other sea conditions, which must be considered in designing engines for certain required speeds.

The argument has been made before the board that the tendency abroad is not to increase the speed of ships and not to sacrifice other important factors to secure high speed. Admiral Melville, however, shows that a British armored cruiser recently made 24 knots and that the finest of the United States ships of this class should not fall below this speed. This is the first time that so serious a disagreement has occurred in the board on the question of speed, the tendency heretofore having been to give ships the highest possible speed for vessels of their class. Admiral Melville believes the navy would be retrograding to build the new armored cruisers with barely sufficient horse power to develop the required speed under the most favorable conditions. When the board finally reaches its decision bids will be asked for the two ships, each of which will represent when in commission an expenditure of about \$6,000,000.

The Townsend & Downey Ship Building & Repair Co., Shooter's Island, N. Y., has well under way the two steel tank barges for the Standard Oil Co. These barges are 360 ft. in length, each. The large tug boat for the Cornell Towboat Co. is in frame. The company has also well along a double-ended screw ferry boat for its own account. The work upon the vessel for the lighthouse board is progressing favorably.



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STEAMSHIP SERVICE ON THE AMAZON.

Lately the Hamburg-American Steamship Co. sent its steamer Alps from New York for ports on the Amazon, including Iquitos, which is in Peru on the eastern side of the Andes about 3,000 miles up the great river. The Alps was the first merchant vessel to be dispatched direct from New York to Iquitos, which is expected to become one of the important interior cities of South America. This is not the first time that a steamer has been sent over the ocean with Iquitos as its destination. An ocean steamer of 1,200 tons reached that far-distant town in 1884. For several years past the Booth Co. of Great Britain has operated a line direct between Liverpool and Iquitos. A while ago the Hamburg-American Line started a service in opposition to the Booth Line, which led to fierce competition between the two companies. The Booth Line began to operate steamers from Hamburg to Amazon ports. Both companies cut rates below the cost of carriage. The fight is now over, a compromise having been arranged between the companies. The Hamburg-American Line has agreed to abandon its New York and English services to North Brazil ports and also its direct service to Iquitos. On the other hand, the Booth Line has agreed to abandon its Hamburg service, but will continue to despatch steamers from England for all Amazon ports as far as Iquitos. Under this arrangement there is no telling when another steamer will be sent direct from New York city to the growing center of the far upper Amazon trade, but the fact is worth noting that one steamship has made the trip; and as the resources of that remarkably rich region are developed our growing commercial interests on the Amazon will doubtless require facilities for direct shipments between New York and the port of eastern Peru among the foot-hills of the Andes.

Nine years ago the population of Iquitos was only 5,000 and it probably does not exceed 10,000 to-day. The world, however, is beginning to understand that the vast region of the upper Amazon tributaries, whose natural collecting point and distributary is Iquitos, is one of the richest parts of South America. This portion of Peru embraces about 500,000 sq. miles and is known as the Montana, a name that covers not only the mountainous districts, but also the widespread alluvial plain through which a great number of large and small feeders of the Amazon make their way. Much of the country is covered with immense forests and according to Courtenay De Kalb and other authorities the timber is of immense value.

The Montana also includes many thousands of square miles of grass and arable lands. A part of these lands, embracing about 5,000,000 acres, is being developed by an English company known as the Peruvian Corporation, which is opening roads, bridging rivers and introducing colonists who are planting coffee and cacao as staple crops. The policy of this company is to make good roads and give all the colonists easy communications

with the rivers that are tributary to Iquitos. These plains are high enough to insure favorable climatic conditions; there are no cold winters to stop farming, but planting is done at all seasons of the year. One crop is harvested and another immediately planted.

All this rich country has, until within the past fifteen or twenty years been quite inaccessible on account of the hostility of the Indians, but there is no longer anything to fear from the Indians, many of whom have helped to cut the paths through the dense forests that are utilized by the rubber collectors. Dr. Sievers, who has been engaged for years in South American explorations, says that rubber trees grow in enormous quantities in the Montana and are rapidly replaced when once destroyed; but he believes that better results might be obtained from a rational plantation system than from the present wasteful method of collecting the sap from trees growing wild.

Peru proposes to extend the Oroya railroad, which she has built from the Pacific to the top of the Andes, down the eastern slopes to Iquitos. When this enterprise is completed there will be steam communications across the continent from Santiago to Para. The Booth company now has several steamers engaged in the Iquitos trade. This direct connection with Europe has vastly stimulated the development of this rich country. Thus far nine-tenths of the farmers are foreigners and the fact that white men may labor in the wide region around Iquitos without impairment of their health is one of the most encouraging factors and promises to contribute very greatly to the rapid development of the Montana.

No part of South America is better worth watching by our merchants than this rich region whose resources are only just beginning to be understood. Iquitos is certainly destined to be a large and flourishing place. Europeans understand this fact. One of the German textile journals for example, publishing an article the other day on the prospects of Iquitos, said that the region tributary to this town is being settled by as energetic and enterprising a population as could be found in South America, and that Iquitos has all the advantages necessary to make it a great trade center. It advised the cloth makers of Germany to lose no time in opening business relations with this coming center of upper Amazon trade.

An examination of applicants will be held at the New York navy yard on Oct. 30 for the purpose of establishing an eligible register for ship draughtsmen from which selections will be made to fill existing vacancies in the department of construction at the New York navy yard. The pay ranges from \$6 per day to \$2 per day, according to the position occupied in the draughting room. All applications are to be addressed to the commandant, New York navy yard.

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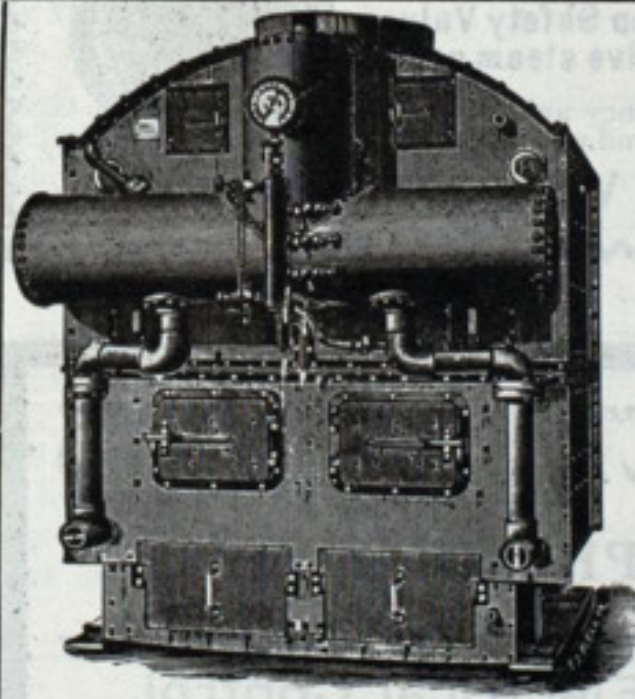
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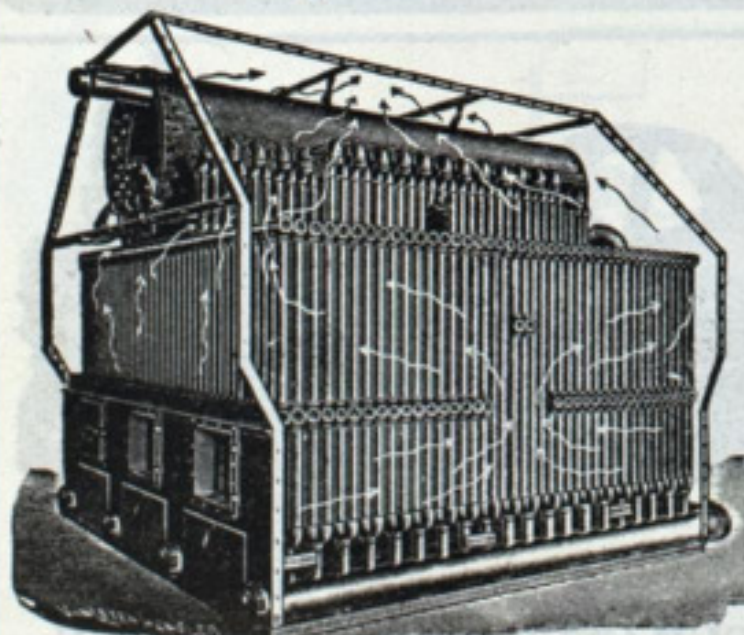
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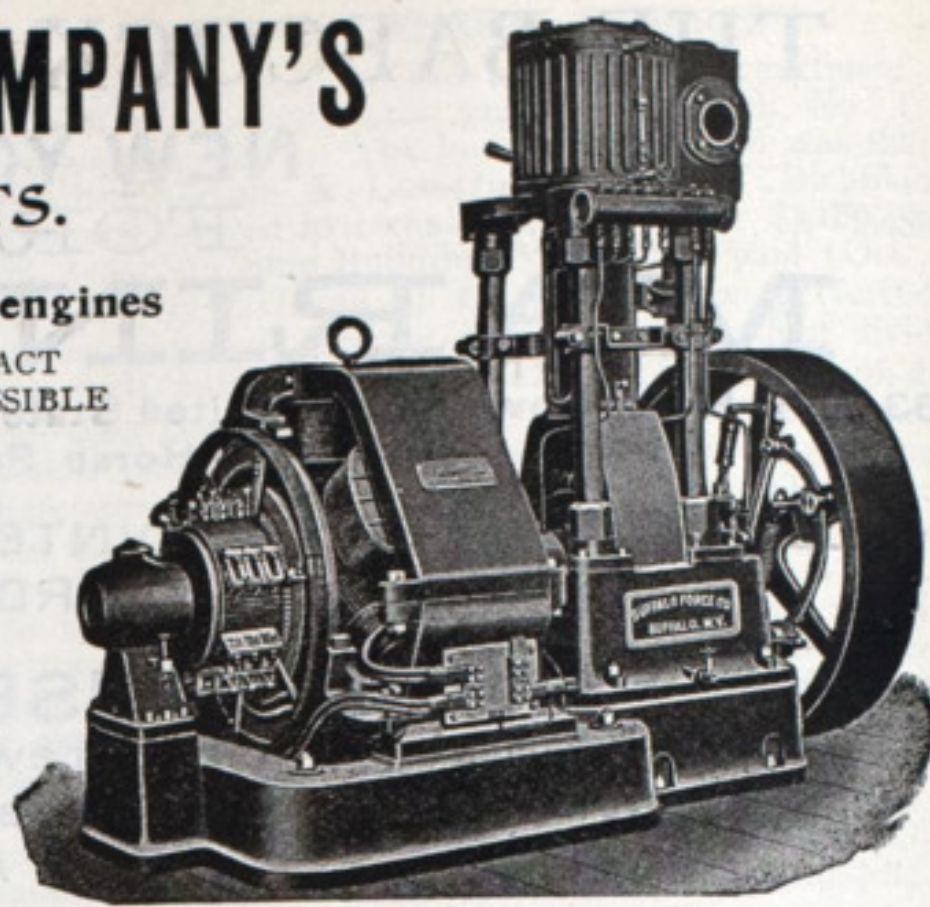
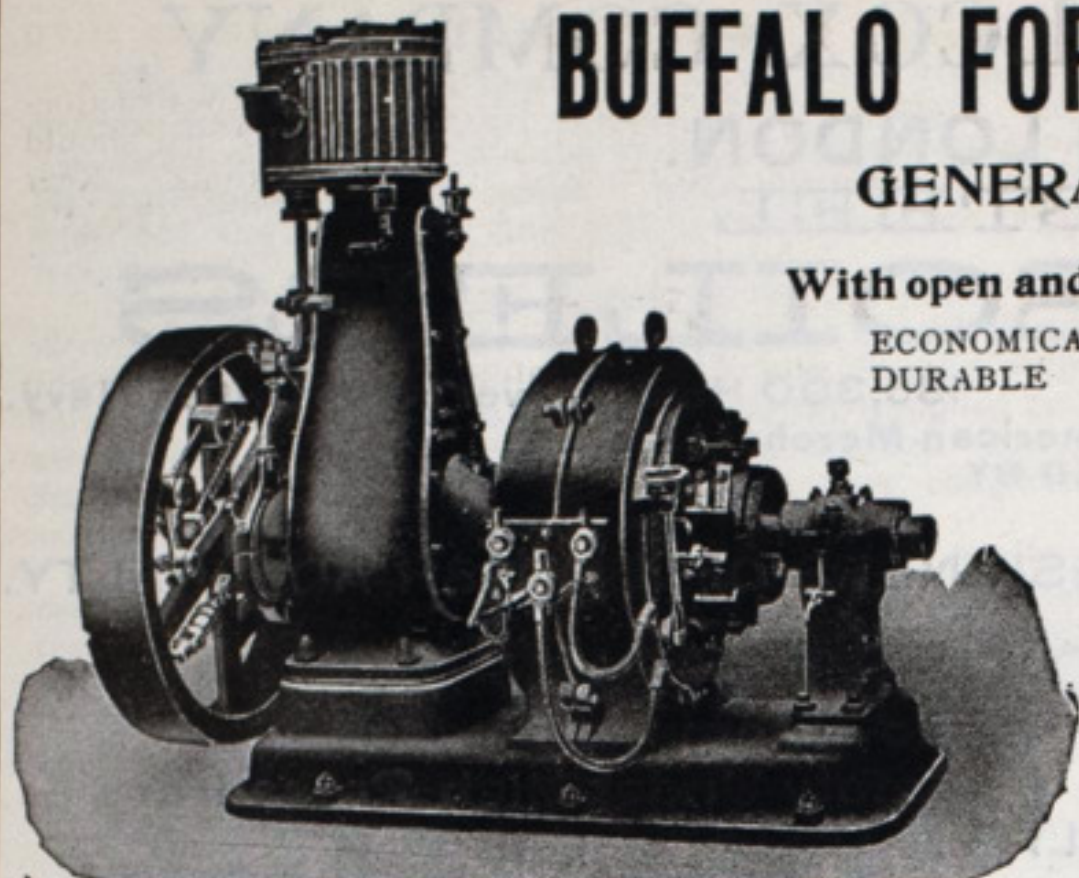
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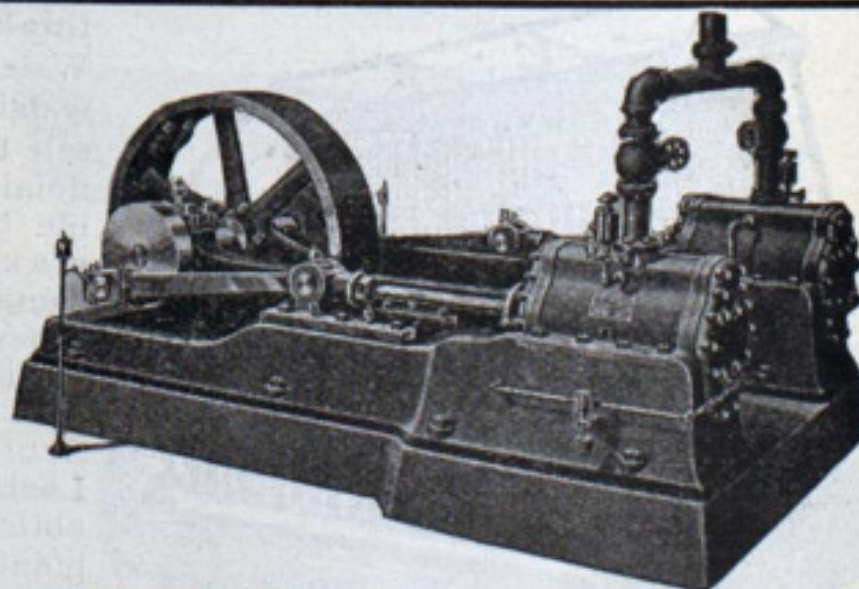
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